JANUARY 1986 $3.00

BM/E

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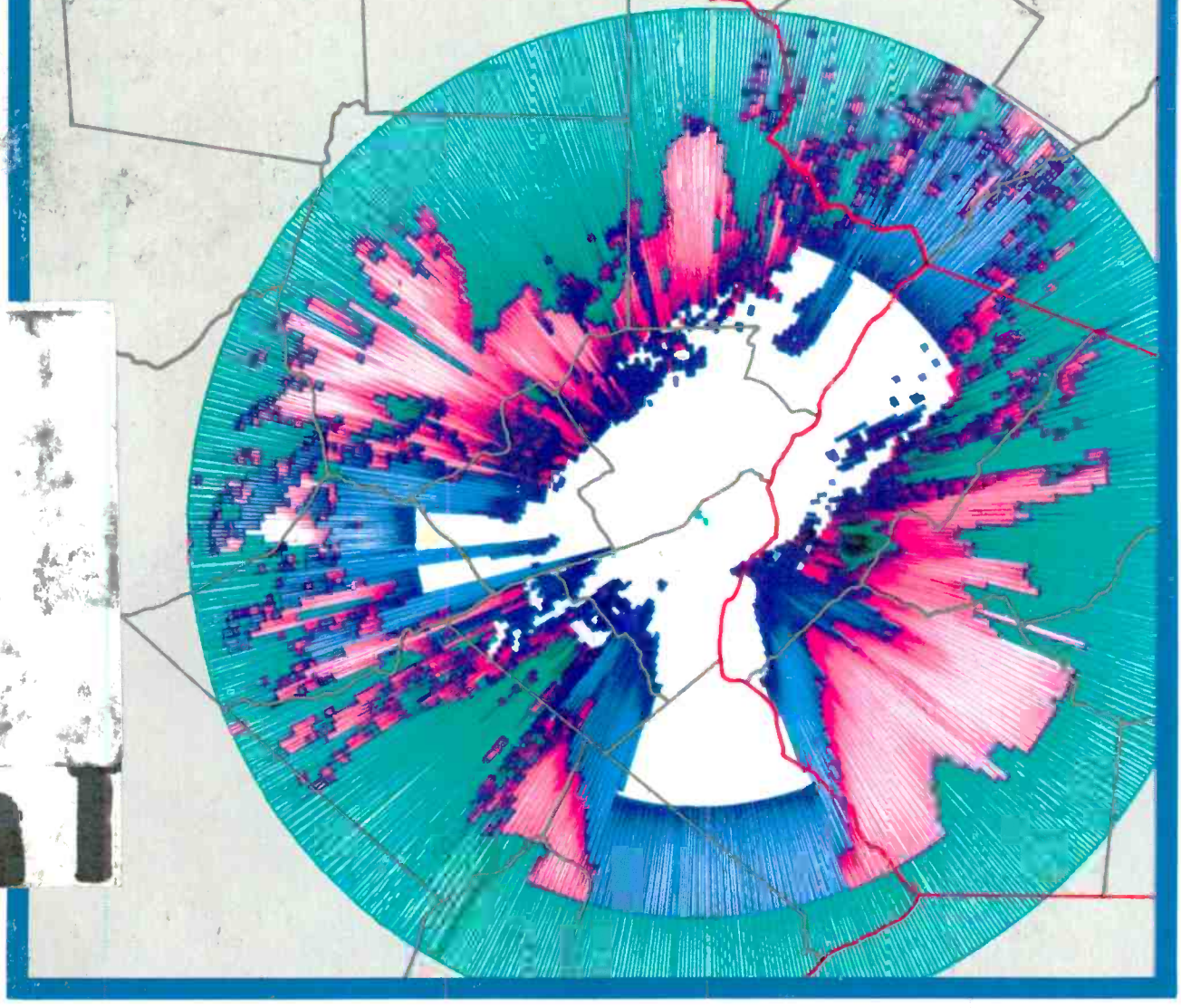

Introducing:

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■ Television Engineering & Production ■ SMPTE Show Report
■ Broadcast Management

The PR99 MKII is a fully professional, balanced in/out ATR that's priced perfectly for broadcasters on a budget. Although compact in size, the PR99 MKII scores big on production features, audio performance, and long-term reliability.

Help for Deadline Dodgers When deadline pressure hits, the PR99 MKII comes to your rescue with new microprocessor-controlled cueing and editing features: A highly accurate real time counter. Zero locate and address locate to find your cue and stop right on the money. Plus auto repeat for timing and rehearsing. The seconds you save will show in your production quality ... and your blood pressure. Other features include edit mode, tape dump, self-sync, input and output mode switching, input and output level calibration, and front-panel vari-speed. Console, remote control, and monitor panel available as options.

Count on It The Swiss-engineered PR99 MKII has earned its reputation for reliability. From the massive die-cast chassis to the servo capstan motor, every part is milled and drilled to fit right and stay put. For a long time. Modular electronics simplify maintenance and servicing.

Pure Performance Purity of sound reproduction has long been a hallmark of Studer Revox recorders, and the PR99 MKII is no exception. Noise, distortion, and frequency response specs rival those of recorders costing far more.

All This for Not Much Competitively priced, the PR99 MKII carries the lowest suggested list price in the under-$2500 class. For more information, contact your Revox Professional Products Dealer. Find out how easily you can fit the PR99 MKII's balanced performance into your station's budget.

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Circle 100 on Reader Service Card

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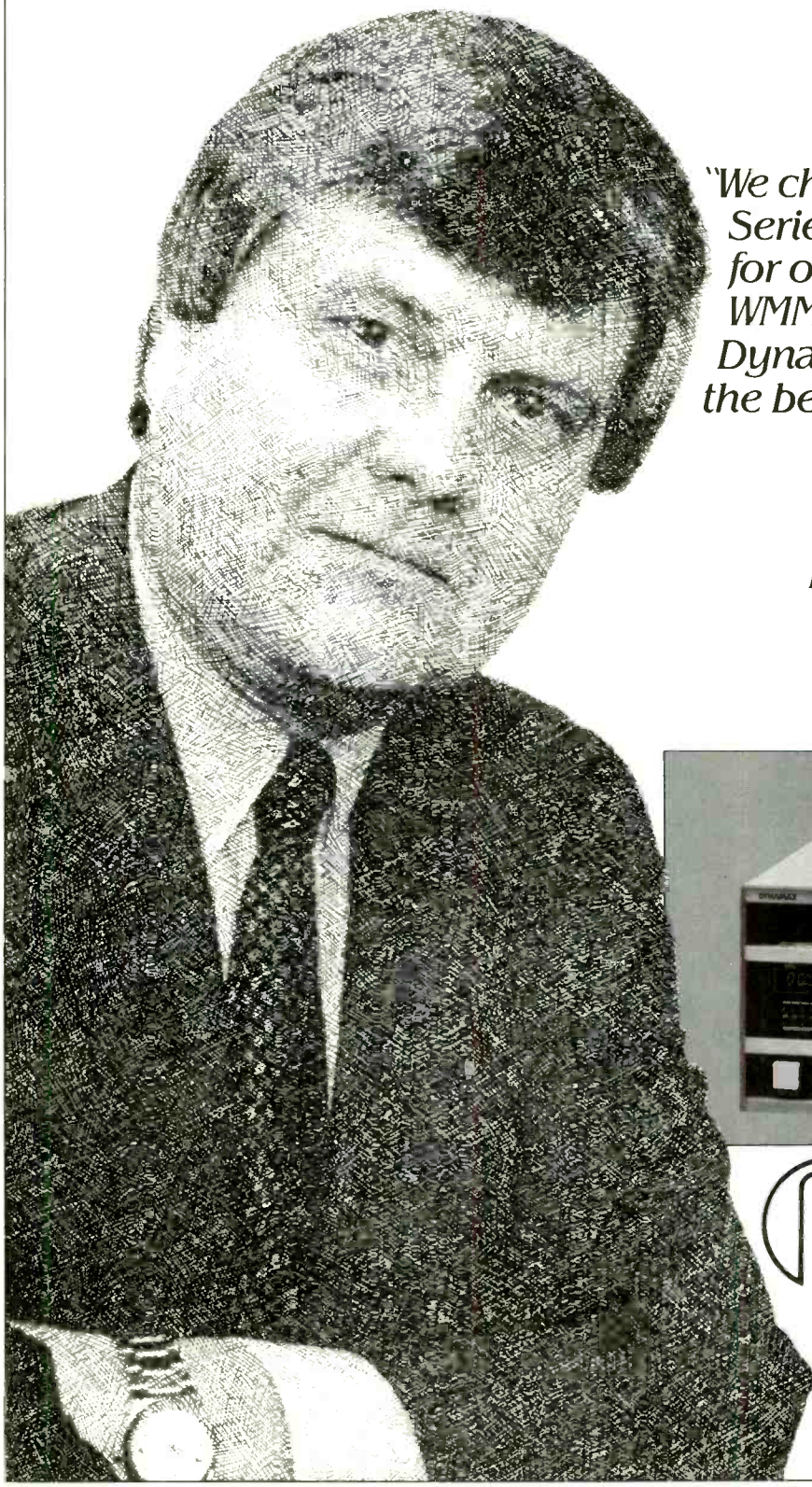

"We chose Dynamax CTR100 Series cartridge machines for our hometown station WMMS, #1 in Cleveland. Dynamax helps give WMMS the best sound in town."

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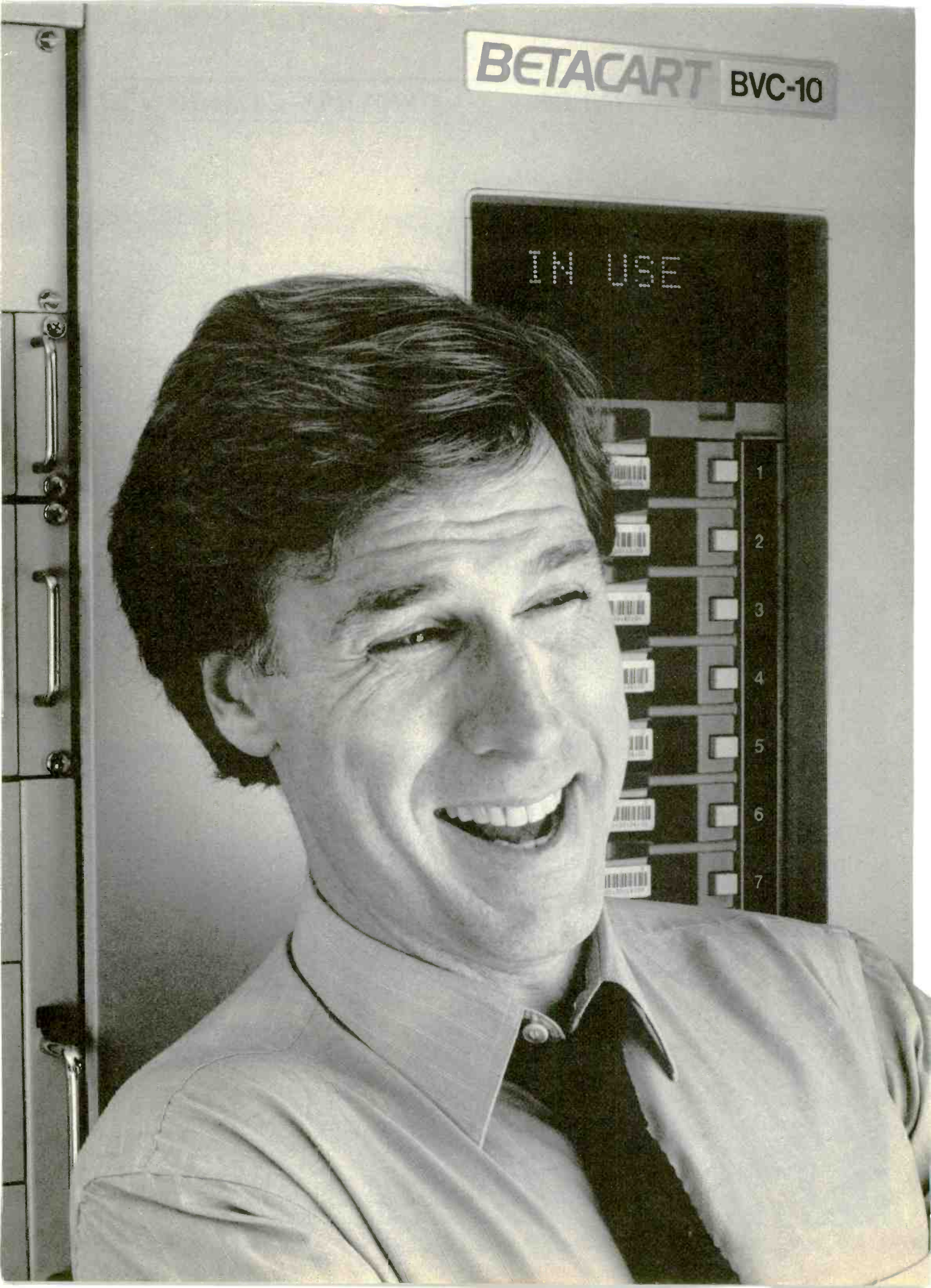
BETACART BVC-10
IN USE
1
2
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7

"Makegood? What's a makegood?"

How soon they forget.

All those people from Anchorage to New York who already use Sony Betacart™ Systems.

They forget about downtime. They forget about on-air backup systems. And they forget about ad agencies demanding damngood makegoods.

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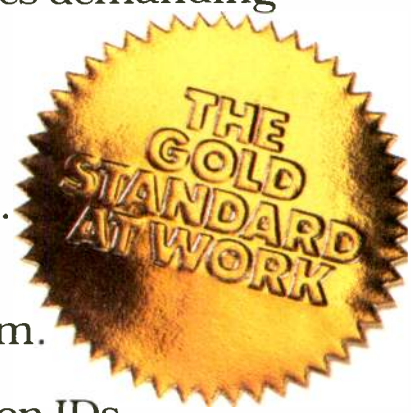
Betacart is the smart cart machine.

Microprocessors keep constant track of forty cassettes. They maintain system alignment. They run self-check diagnostic routines.



And Betacart's simple operation not only prevents human error, it prevents human boredom.

Technicians at KDNL, St. Louis use their Betacart to put snap into station breaks. For station IDs they shoot logo artwork, add movement with digital effects and air the cassettes through the Betacart. Now there are no more dull title cards at KDNL.

At WDBJ, Roanoke, commercial delivery has improved dramatically. So has the picture quality of the spots.

Carl Guffey, director of operations, reports: "The sales staff is happy, traffic is happy, the engineers are happy and the general manager is ecstatic."

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Circle 103 on Reader Service Card

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Also publishers of:
BM/E's **World Broadcast News**
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BM/E BROADCAST MANAGEMENT ENGINEERING (ISSN 0005-3201) is published monthly by Broadband Information Services Inc. BM/E is circulated without charge to those responsible for station operation and for specifying and authorizing the purchase of equipment used in broadcast facilities in the U.S. and Canada. These facilities include AM, FM and TV broadcast stations, CATV systems, ETV stations, networks and studios, audio and video recording studios, telecine facilities, consultants, etc. Subscription prices to others $24.00 one year, $36.00 two years. Foreign $36.00 one year, $60.00 two years. Air Mail rates on request. Copyright 1986 by Broadband Information Services, Inc., New York City. Second class postage paid N.Y., N.Y. and additional mailing offices.
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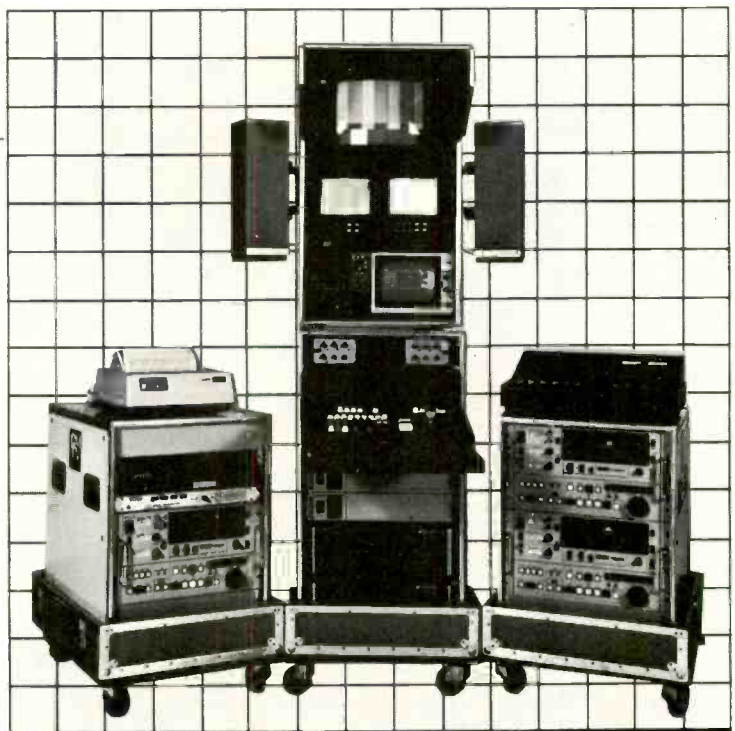
The affordable, portable editing system. At Camera Mart.



Camera Mart Transportable "Super System"

"Super System" is a fully portable ¾-inch A–B Edit System based on the Convergence Edit Controller. It is completely self-contained, can be rolled from room to room and shipped anywhere in the world.

Open the cases, plug in and you're ready to power up in a matter of minutes.

It has one BVU-800 and one BVU-820 as source machines feeding one BVU-800. Other configurations are available employing combinations from half-inch through one-inch.

The Editor is supported by two TBC's, time code, dual floppy disk drives, high-speed printer, switcher, and audio mixer. Monitoring includes dual 8-inch color monitors, one 12-inch color monitor, wave-form monitor/vectorscope, data display monitor, and 2-channel audio system. All permanently mounted and pre-wired.

"Super System" was built for Camera Mart rentals by the Systems Division of Camera Mart. You can rent it from us or have one built to your specifications.

It's new, and, as you'd expect, it's available right now from Camera Mart.

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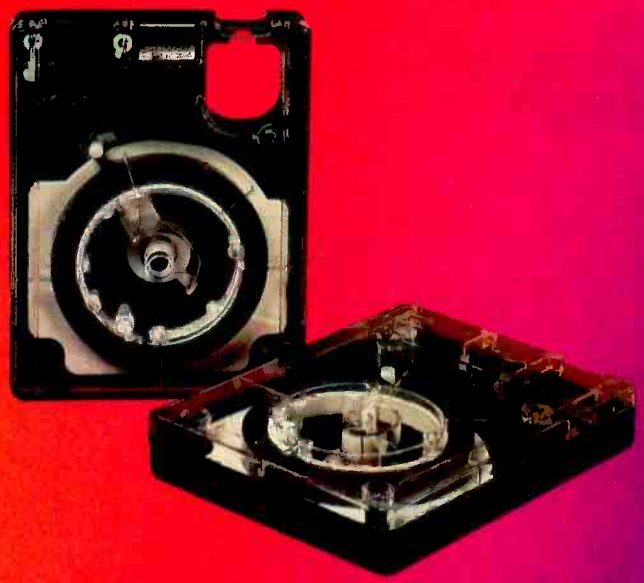
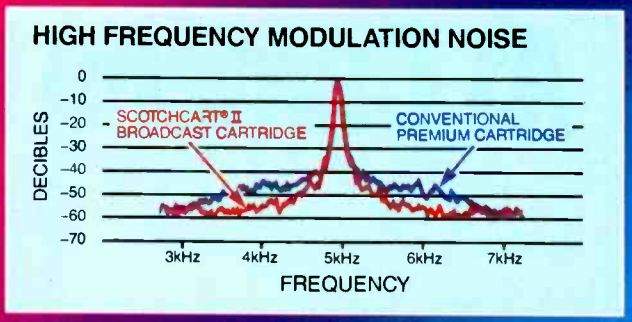


A REAL VALUE

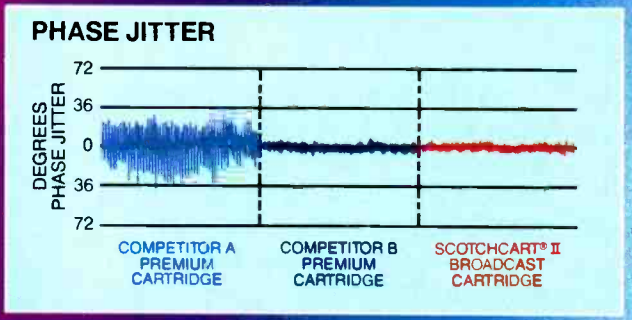
No broadcast cartridge in the world combines long life and performance like the new ScotchCart® II cartridge. Tape and cartridge design complement each other like never before in the ScotchCart® II broadcast cartridge. Its revolutionary design eliminates pressure pads, utilizes a non-rotating hub, and now . . . a new tape! With 5 times the average life of its nearest premium grade cartridge competitor and superior audio performance, the ScotchCart® II broadcast cartridge is your best value ever.

PERFORMANCE ADVANTAGES

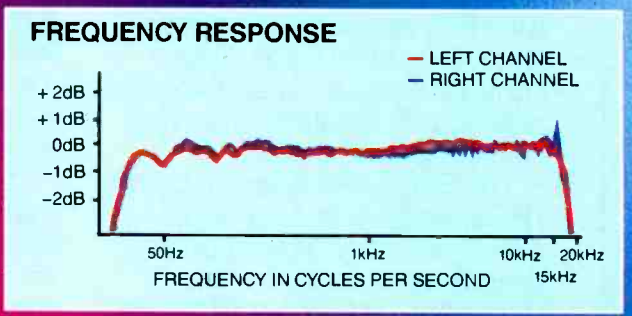
To be successful in today's competitive environment, professional broadcasters need the best. The ScotchCart® II broadcast cartridge clearly outperforms its premium grade competitors.



The Revolutionary ScotchCart® II broadcast cartridge design eliminates the excessive audio sideband noise which results from the rubbing effects of pressure pads and the mechanical irregularities of rotating hubs found in conventional cartridge designs.



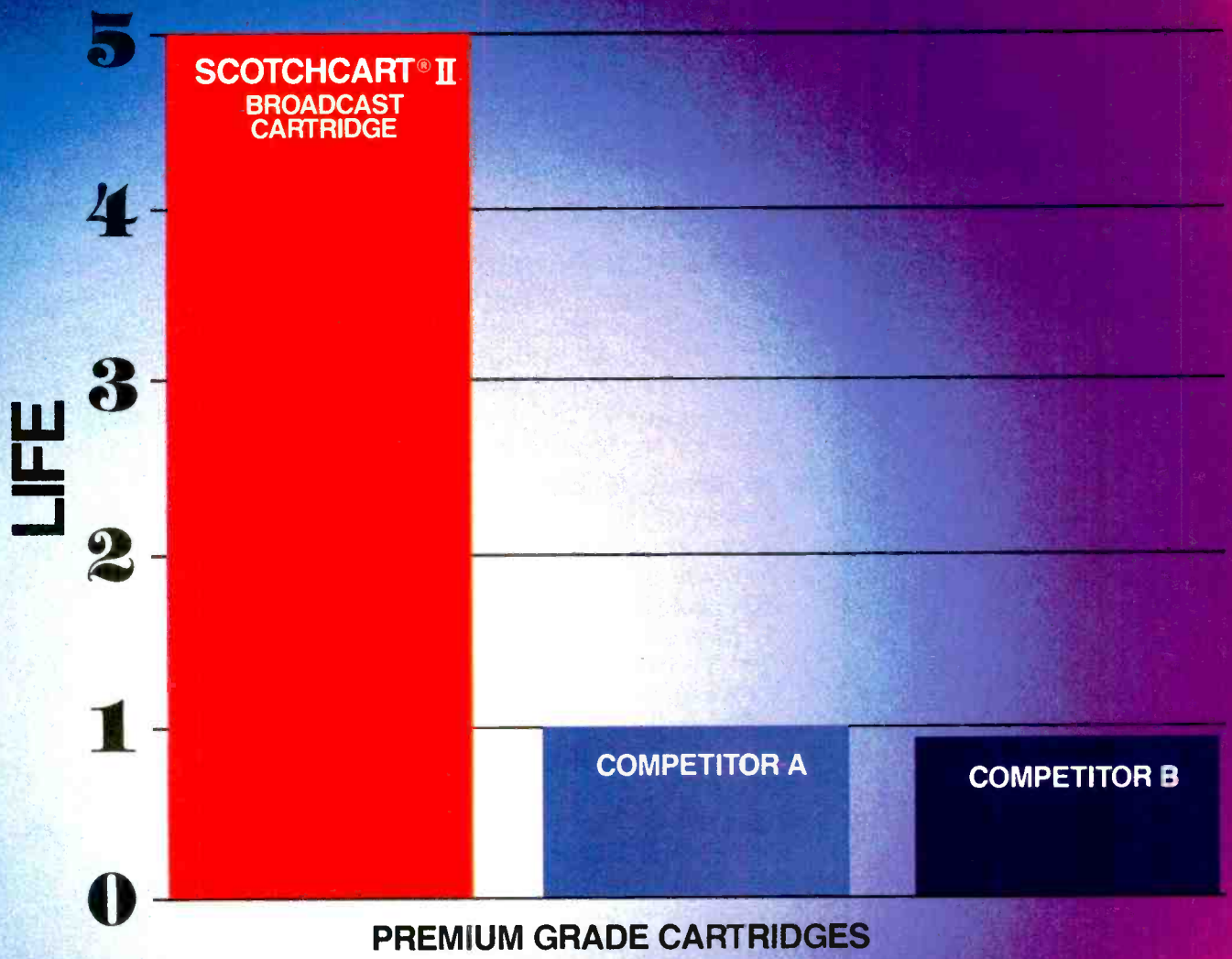
Some competitive cartridges sound muddy on the air because of excessive phase jitter. ScotchCart® II broadcast cartridges sound crisp and clean.



The new tape was conceived as an integral part of a complete cartridge system. When used with high quality equipment, such as an ITC "99B" cartridge machine, the ScotchCart® II broadcast cartridge is capable of frequency response equalling professional reel-to-reel performance.

chCart® II

Life of its Nearest Competitor



Results are based upon tests using 3.5 minute length premium grade cartridges and ITC cartridge machines. A cartridge was considered at the end of useful life when it reached a 5 dB frequency response loss at 10 kHz, .5% DIN weighted flutter, or mechanical failure. These criteria represent easily recognizable problems that should result in the cartridge being removed from service.

To order ScotchCart® II broadcast cartridges or request a technical manual to optimize ScotchCart® II performance, contact your local 3M sales office, your professional audio dealer, or call International Tapetronics Corporation/3M at **800-447-0414** or collect **309-828-1381** from Alaska or Illinois. In Canada, call Maruno Electronics, Ltd. at **416-255-9108**.

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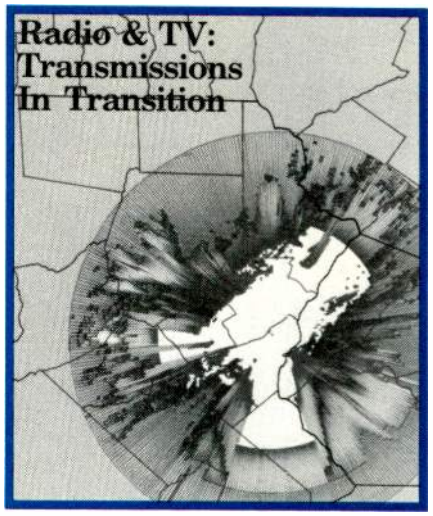
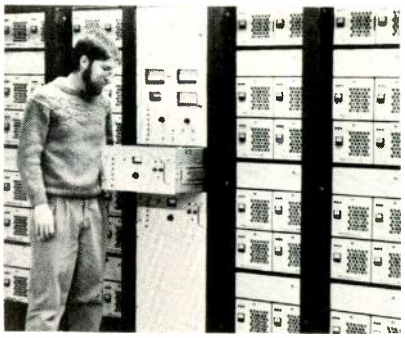


JANUARY 1986 VOLUME 22/NUMBER 1

BM/E

BROADCAST MANAGEMENT/ENGINEERING



Features

Departments

Cover Story:

Compucon, a subsidiary of Spectrum Planning, Inc. specializes in these detailed propagation studies. A computer integrates digitized data on terrain, station power, antenna type, and location and length plus other factors to produce a multigradient model of the station's coverage area.

TEN REASONS TO CHOOSE THE NEW WESTAR CONSOLES FOR VIDEO/TV/FILM:

1. NEW DESIGN. State-of-the-art design for stereo and multitrack production.

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10. DEPENDABLE. Under the $8 billion strong Mitsubishi Electric umbrella, Quad Eight is the most solidly backed of all professional console makers.

For more information, please call or write.

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"While there have been numerous changes in BM/E, *some things remain the same—particularly our commitment to maintain the highest editorial standards in choosing stories and presenting them."*

Welcome to the 'New Look' *BM/E*

We've taken note of the increasing demand on the time of radio and television broadcasters and producers of all types and have responded with a new approach to organizing and presenting your monthly package of *BM/E* information.

First of all, since most of our readers are management and line management of engineering and technology for radio and television, we've developed four new feature story wells dedicated to four distinct areas of concern: Audio Engineering and Production for Radio and TV, Television Engineering and Production, RF Engineering for Radio and TV, and Broadcast Management. Each month, *BM/E* presents one or more feature stories in each of these areas. Frequently, a consistent theme will run through each of these sections in order to provide the reader with a totally comprehensive treatment of a major topic affecting the growth and development of radio and television. At other times, a theme may run through just two or three of the sections.

While there have been numerous changes in *BM/E*, some things remain the same—particularly our commitment to maintain the highest editorial standards in choosing stories and presenting them. Moreover, some special issues that readers have learned to depend on like our *NAB Show-In-Print* and our annual buyers' guide, *The Source,* will abandon this new format temporarily in order to continue with an efficient presentation of their special contents.

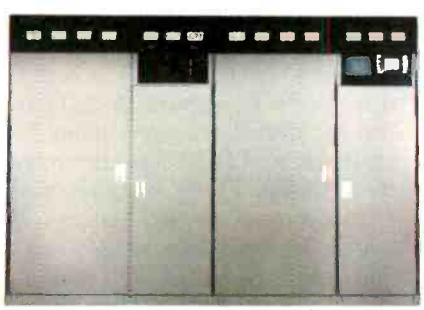
We sincerely hope that you will find our "new look" useful and effective so that you can get even more satisfaction from your reading of *BM/E*. Let us know what you think. As always, *BM/E* stands ready to respond to your ideas and inputs in order to present you with the most rewarding "professional broadcast" reading experience available. We believe that getting better is part of our ongoing responsibility to you.

David Hawthorne
Editorial Board Chairman

Comark performance satisfies the most exacting customers...again and again.

Harry Pappas was so impressed with his first Comark "S" Series 220kW Transmitter, he bought a second.

You don't get to be a leader in the independent television broadcast industry by making the wrong decisions about TV transmitters. When Harry Pappas was ready to build his New Super-power station, WHNS-TV in Asheville, N.C., he chose the Comark "S" Series 220kW Transmitter. In Harry's own words: "The transmitter lived up to the promises made by the Comark people...and then some. In terms of performance, specifications and efficiency ratings, I couldn't have asked for more."



Naturally when it came to choosing the transmitter for his next station in Omaha, Nebraska, there was only one choice: Comark's "S" Series 240kW rig.

At Comark, we are especially proud to have gained the confidence of a knowledgeable industry leader like Mr. Pappas. But building superior transmitters is only a part of our story. We continue to work even harder at building a superior transmitter company.

Customer service backed by engineering in depth is Comark's formula for satisfying the needs of the most exacting user.

Services and Equipment that Comark supplies include:

- Klystron UHF Transmitters from 10kW to 240kW
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- 24-hour Field Engineering and Customer Service
- RF Transmission Line, Components and Hardware
- Site Surveys

Whether your requirements are simple or complex, Comark stands ready to professionally satisfy your needs. Call (215) 822-0777 or write Comark, P.O. Box 506, Route 309 and Advance Lane, Colmar, PA 18915.

COMARK

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FCC Proposes AM/FM Program Duplication

The FCC has proposed "eliminating entirely" its restrictions on program duplication for co-owned AM and FM stations in the same area. With this action, the Commission has taken another step in implementing the sweeping changes for AM suggested by Mass Media Bureau chief James McKinney (see *BM/E*, November 1985, p. 14).

As currently written, AM/FM combos in communities with populations over 25,000 cannot duplicate more than 25 percent of their programming on average.

The Commission noted that FM has become a "fully competitive and viable" broadcast medium that no longer needs protection from AM—certainly an understatement. Also, it estimates that more duplication will not be a waste of spectrum since the service areas of many combos do not overlap.

On the list of benefits, it found that nighttime service might be increased and that AMers with financial trouble might be helped.

The FCC has asked for comments, especially concerning possible effects on spectrum efficiency, expansion of radio service, and AM station viability.

Edit Suite A at Tele-Image's big Dallas facility features a Grass Valley Group 300-3A switcher with E-MEM and E-Disk, Chyron RGU-2 character generator with font and logo compose, a Sony 618 audio console, and Studer A-810 and A-800 synchronous two- and eight-track ATRs.

Tele-Image Offers New Dallas Production Facility

Tele-Image has begun servicing the nation's, as well as the southwest region's, needs with its new 32,500-square-foot, $5 million television production facility in Dallas. Three of six proposed edit bays are completed, along with advanced audio-for-video facilities. Audio equipment includes a Solid State Logic SL 4000E console, Studer 800s, an 810, and 820 ATRs, and Lexicon 224-XL reverbs. Productions have so far run the gamut from corporate videos for Diamond Shamrock and Tandy to commercial spots for Dr. Pepper.

New Ku Broadcast Bird Launched; SNG Continues Growth

A new Ku-band satellite—powerful enough to beam signals to one-meter dishes—has been placed in orbit by NASA's Atlantis space shuttle. On the ground, SNG continues its explosive growth as CBS and ABC rush to set up more regional news networks and NBC plans a similar network nationwide, with a three-month trial due this winter. Meanwhile, Conus, the Hubbard Communications-sponsored SNG network, has topped the 30-station member mark.

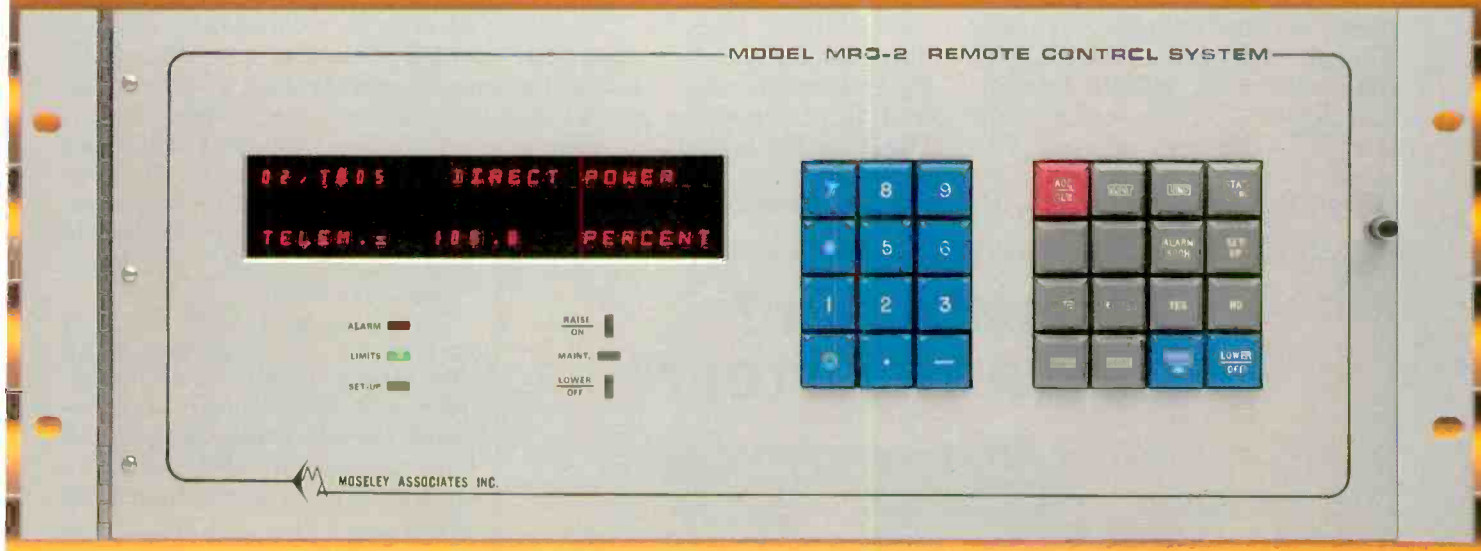
The new 45 W per transponder satellite, Satcom K-2, is scheduled for use by NBC, Conus, and RCA to distribute programming and news material to stations in the continental U.S. RCA Americom, which built the satellite, says it will be the most powerful Ku bird up, since most existing Ku-band satellites use 20 W, while C-band is limited to 8.5 to 10 W. NBC will deliver programming via K-2; Conus plans to expand capabilities for its members and other subscribers; and RCA Americom says it will offer TV syndicators a distribution service. RCA says it has begun building up a network by signing a reported 550-plus stations for installation-cost only satellite systems.

Of two more high-powered Ku satellites planned, one was due for launch late in December.

On the receiving end, the three television networks are hurrying plans for satellite news networks. CBS has opened a western regional news network based at KSL-TV in Salt Lake City, UT, with secondary centers at KOIN-TV, Portland, OR, and KXTV in Sacramento, CA. The regional network, the third for CBS, will cover Oregon, Washington, Idaho, Montana, Wyoming, Colorado, Utah, Arizona, and New Mexico. CBS hopes to add three more nets for the midwest and northeast by this spring.

ABC will launch a mobile satellite newsgathering network, dubbed ABSAT, that will feature 50 mobile uplinks to be based at and owned by its affiliates across the country. The network's second satellite network is pegged for a mid-1986 startup.

NBC's news network, still in the planning stages, will operate nationally with Satcom K-2. A three-



The Moseley MRC-2. Commander in Chief.

Organizing a large, complicated facility is a lot like going to war. The enemy is the law of negative entropy—the tendency for things to get out of control. More and more, broadcasters are issuing *executive commands* through their MRC-2 Microprocessor Remote Control.

Optional CRT and Logger.

Multi-site, Multi-function

The MRC-2 controls and monitors as many as 99 remote sites, with multiple Control Terminal capability to let you delegate control from master to master as needed. Up to 255 status, 255 telemetry, and 255 command channels supervise your sites. Dual tolerance limits can be set to prevent a telemetry parameter from reaching critical levels. Choose from 6 modes in which to calibrate telemetry inputs, and set status inputs to initiate alarms or events on rising or falling waveforms, or both.

Control Options

Optional Automatic Loggers provide a printed record of system operation, and CRT terminals display your data in plain language. An optional ACU-1 Automatic Control Unit automates your operation by issuing programmable time and feedback-actuated sequences of commands without operator assistance. Add Multiple Direct Command and Multiple Status Display options for streamlined operator interface. Whatever your strategic needs, the MRC-2 has the firepower to control your war zone. To issue your orders, contact Moseley Marketing or your Authorized Moseley Distributor.

Moseley Associates Inc., 111 Castilian Drive, Goleta, California 93117, (805) 968-9621, Telex: 658-448, Cable: MOSELEY

MOSELEY ASSOCIATES, INC.
A Flow General Company

Circle 108 on Reader Service Card

month test run is anticipated for February.

In other SNG news, all the Hearst Broadcasting Group television stations are now part of the Conus network. WBAL-TV, Baltimore, MD; WDTN, Dayton, OH; KMBC-TV, Kansas City, MO; and WTAE-TV, Pittsburgh, PA, are new members; Hearst's WISN-TV in Milwaukee, WI, was already in Conus. RKO's Los Angeles independent, KHJ, and WRTV, Indianapolis, IN, have also joined the net.

In addition, Hubbard Communications, Inc., has developed a delay system especially for satellite feeding of television programs. The HCD-500 is said to be able to delay any incoming program from three minutes to two hours.

"Transmitter? What transmitter?"

Over 100 stations have "forgotten" their B/E medium power FM transmitters. Such dependability is always easy to take for granted . . .

1. *The reliable FX-30 Exciter. Superior FM performance with the lowest distortion and the finest response.*
2. *Proportional VSWR foldback which keeps you on the air during adverse operating conditions and the broad-band input matching network which maximizes bandwidth and stability.*
3. *Greater reliability through the ruggedness of the patented folded half wave cavity design; no plate blocking capacitor or sliding contacts!*
4. *Digital control and the exclusive optional micro-processor video diagnostic system. (MVDS) Available only from BE!*

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Circle 109 on Reader Service Card

Tinker Optimistic On NBC Acquisition

Last month's acquisition of RCA Corp. by long-time rival General Electric "is good news for all of us at NBC," according to NBC chairman Grant Tinker. In a December 12 memorandum to NBC employees, Tinker expressed confidence that "The resources of the combined companies will not only enhance competition in the world marketplace, but will also strengthen NBC."

Tinker cited a letter to RCA employees by RCA chairman Thornton F. Bradshaw and president and CEO Robert R. Frederick, in which they stated, "GE has a long history of providing an environment in which businesses gain from being part of GE, but have the entrepreneurial freedom to grow rapidly and independently."

NBC reportedly has been interested in additional station acquisitions and cable ventures, and it may be that GE ownership will allow the network to pursue those options.

Ownership of NBC is viewed as a major benefit of the deal for GE, which had been seeking to enter the communications business for some time. A few months back, GE had offered to aid CBS with a friendly takeover in its attempt to avoid acquisition by Ted Turner. With the present purchase, GE comes into possession not only of NBC, of course, but also of RCA's considerable consumer electronics, semiconductor, and satellite operations. Both companies have extensive military contracts.

The cash deal is valued at $6.28 billion and is the second sale of a commercial broadcasting network in 1985; Capital Cities' purchase of ABC was the first.

News of the acquisition came just weeks after RCA shocked the broadcast industry by closing down its broadcast equipment operations, which had been a key force since the 1920s despite recent years' losses.

Meanwhile, across the Atlantic, another major broadcast-industry power has closed its doors. Pye TVT, the broadcast equipment

Professionals on the Road in Florida Midwest and JVC

As the leader in the United States in the design and manufacture of mobile units, Midwest utilizes the finest in video equipment — and that means JVC. We know that when you're on the road you need a camera that will give you top-quality performance.

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WXEL's M30 Mobile Unit carries four JVC KY950U Color Cameras which produce broadcast quality signal-to-noise ratio, resolution and performance. The KY950U uses a prism optical system and Plumbicon* pickup tubes.

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arm of Philips in the U.K., last month announced its intentions to close down all operations. A Philips spokesman cited serious financial losses as the reason for Pye's failure. Third world countries, which were a major market for Pye, have been hard hit by recession in recent years.

Pye was a systems house especially known for mobile van and studio construction. Philips will continue to manufacture its studio equipment, including the LDK camera series, in the Netherlands, and says it will honor Pye's sales and service commitments for Philips equipment.

Neve Audio Sold to Siemens A.G. Austria

Rupert Neve, Inc. of Bethel, CT, has announced that Siemens A.G. Austria and Siemens Ltd. UK have agreed to buy the audio console and processing equipment manufacturer from its new parent company, Brammer plc.

In a prepared statement, Laci Nester-Smith, group marketing manager for Neve Audio, said that "Siemens is committed to the further development of Neve's technology in both the analog and digital fields and significant R&D programs are planned."

Neve Audio is best known for its large, automated audio consoles, used widely in the television industry. Siemens is a large, multinational electronics firm that sells audio amplifiers and smaller consoles internationally.

Deliberate Satellite Interference?

TVRO dish owners may be deliberately interfering with satellite transmissions, according to Eastern Microwave, Inc., which has complained to the FCC of serious interference with Galaxy I transponder feeds to WOR-TV, New York, NY, a superstation. If true, the problem could become particularly difficult as cable channels begin to scramble their signals after years of TVRO "freeloading."

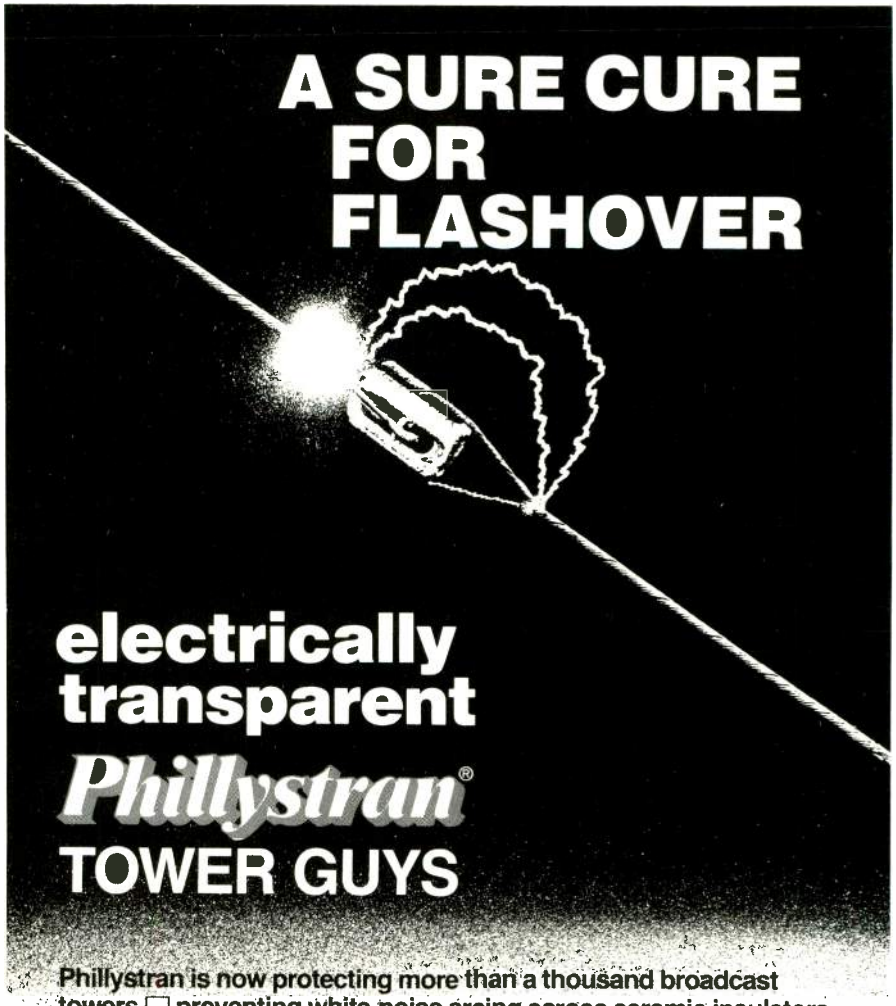
Though the FCC reportedly is considering strengthening its penalties for the crime, interfering with a satellite is not a difficult task and tracing the perpetrator can be all but impossible.

As for motive, many TVRO owners are angry about not being able to receive premium cable programming for free, and trade publications for the field are said to have carried material proposing such actions.

Aural STL/ICR, TV Auxiliary Broadcast Rules Changed

In an effort to make more efficient use of the spectrum, the FCC has changed its rules governing aural broadcast STLs, intercity relay, and television auxiliary broadcast stations. Alterations in Part 74 of the rules are as follows:

- The STL/ICR 950 MHz band will be divided into 25 MHz "stackable" segments and the 1990-2110 and 6875-7125 MHz TV pickup bands into 1 MHz segments for flexibility in channel bandwidth.



Phillystran is now protecting more than a thousand broadcast towers ☐ preventing white-noise arcing across ceramic insulators (they aren't required) ☐ eliminating problems with on-off cycling due to static discharge on steel guys.

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• 300 kHz will be the narrowband criterion for FM stations and 200 kHz for AMers, while 500 kHz will remain the wideband criterion. Narrowband-licensed stations will be able to lease excess capacity on a primary basis, and wideband on a secondary basis.

• Emission standards will be changed so that single sideband technologies can be licensed without rulemaking.

• STL/ICR stations will be able to operate in the UHF-TV spectrum depending on full-power TV, LPTV and translator stations operating now or in the future.

DTTR Standard Ready for Int'l Approval; More HDTV Questions

A component digital television tape recording (DTTR) format has been recommended by study groups of the International Radio Consultative Committee (CCIR) for international adoption this spring. Separately, the prospects for a universal HDTV format are seen to still face trouble from European opposition, and companies involved in film are assessing their chances with the upgraded medium.

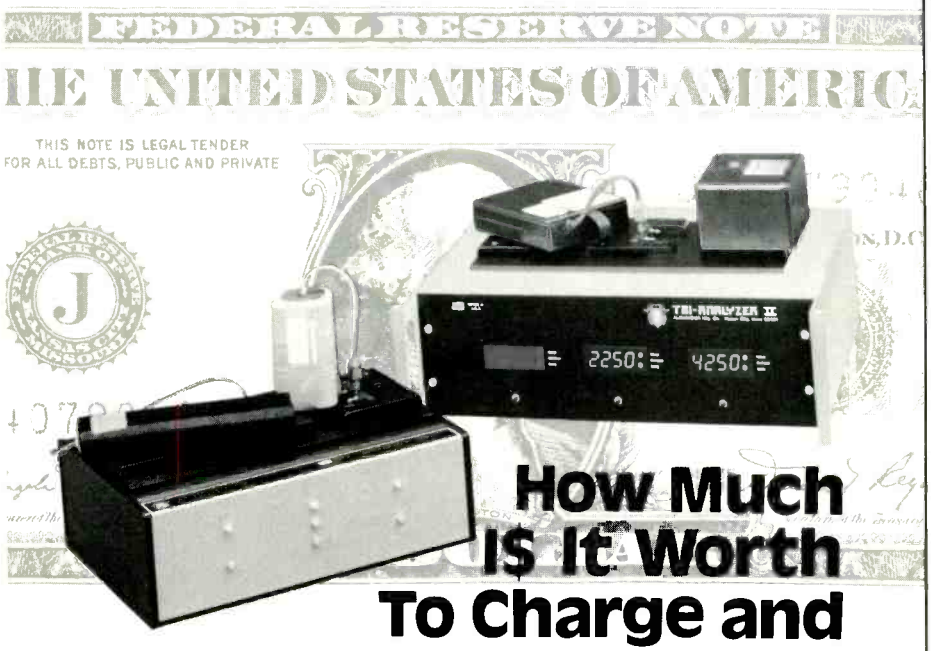
The new DTTR format, fortunately, appears to face no such problem. SMPTE reports that it was developed "in close cooperation" with the European Broadcasting Union since CCIR Recommendation 601 was passed four years ago. It calls for the use of digital component signals, sampled at a rate of 13.5 MHz for luminance and 6.75 MHz for each of the two color difference signals.

The format now awaits final approval at the CCIR Plenary Assembly in Yugoslavia in May. It is expected to receive easy passage there.

The 60 Hz HDTV standard approved recently (see *BM/E*, December News section) is not expected to have quite such an easy road. The standard was approved by its working group, but reservations were attached to the approval due to objections by the French and Dutch delegations. These countries reportedly are concerned because the satellite and cable distribution systems that are rapidly being installed across the European continent do not have the bandwidth necessary to handle the approved HDTV standard.

The reservations could prove problematic at the Plenary Assembly if those countries decide that their needs are not being met and that they are willing to form their own HDTV system.

Among HDTV issues discussed at the Los Angeles SMPTE convention (see Show Report in this issue) was the question of higher film quality, raised by SMPTE keynote speaker Wilbur J. Prezzano, group vice president and general manager of Photographic Products for Eastman Kodak Co. Prezzano questioned whether HDTV would keep pace with film. "Kodak anticipates being able to improve the performance of today's film products by a factor of 10," Prezzano said, suggesting that HDTV might not



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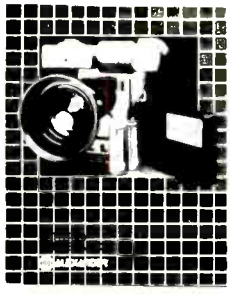

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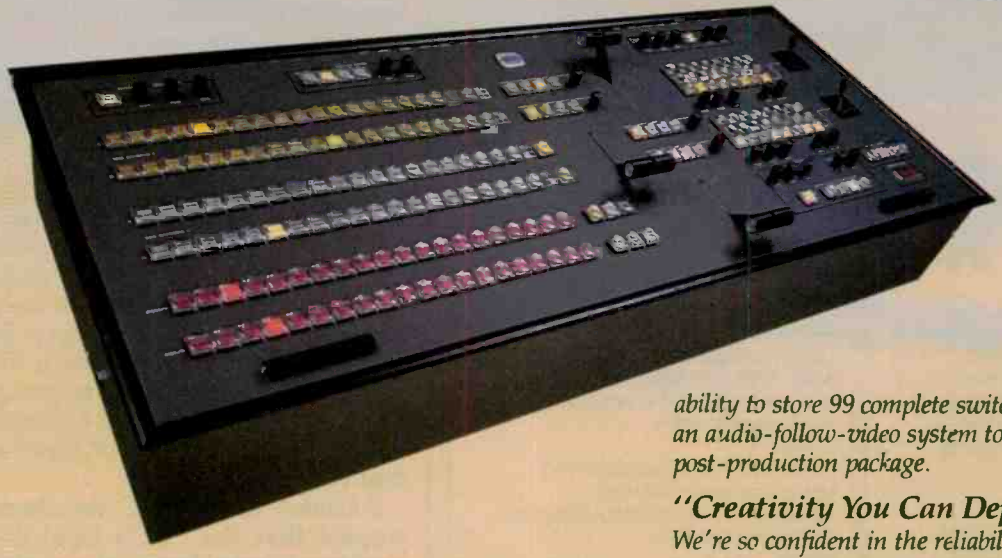
A Wizard's Dilemma...

Creativity vs. Technology

Today, creative video communication requires a production switching system capable of integrating graphics, digital effects, computer editing and audio. Trouble is, the technical demands of operating most large production switchers get in the way of creativity.



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come into play at all in theatrical movies. Also, theaters themselves were said to be able substantially to increase image quality with new projection equipment.

FCC Proposes Work on Must-Carry Rules

The FCC has proposed rewriting its must-carry rules, and an INTV either/or proposal that would offer cable operators a choice between carrying all local stations or not receiving free retransmission of broadcast material is seen as the most likely vehicle to try and tackle the issue. Deliberations on rules concerning cable carriage of MTS, teletext, and VBI have been tied to this action.

The FCC has come under heavy pressure from broadcast groups since an appeals court last summer struck down the Commission's must-carry rules as unconstitutional (see *BM/E*, September 1985, p. 14). The decision has presented a tough obstacle to reinstating some version of must-carry; the FCC has not attempted to reinstate the rule, and no one has yet come up with any new version that would have any realistic chances for survival. With cable operators receiving programming from local stations, however, broadcasters have said that an inequality now exists.

The Association for Independent Television Stations has come up with a flank attack on must-carry that, as of press time, seemed to be a solution the FCC might try. The INTV proposes changing the compulsory copyright rules to require operators to carry all local stations without charge on their basic tier. "Local" would be defined to include all licensees whose local service areas cover the cable system. INTV reasons that this way, cable companies and the NCTA cannot complain that their First Amendment rights are being infringed, and they would be given a clear choice: either carry local television stations or don't get a free ride.

In proposing the combined notice of inquiry and notice of proposed rulemaking, both FCC chairman Mark Fowler and commissioner Mimi Dawson said they appreciated the INTV's specific suggestions since they were almost the only association or group to come up with one, and Dawson commented that she felt it has the best chance of success.

At least a few FCC watchers suspect that the FCC's legal department may have given the green light to the INTV plan since the Commission's inquiry is being rushed through with only two months for comments and replies.

Rules for mandatory carriage of broadcasters' MTS, teletext, and VBI transmissions have been tied to this action, and commissioner James Quello has expressed concern that they may not receive adequate attention or could even be inadvertently scuttled. "If the Commission chooses not to adopt any mandatory carriage rules," he noted in a statement, "these other dockets could be dismissed."

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The RE201 Dual Channel Audio Analyzer looks and performs like no other Audio Analyzer. It has proven itself through a range of applications from testing studio mixer desks, to quality control in transmission links to, helping broadcasters meet required standards.

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Political Editorial Rule Challenged

The Administration's Office of Management and Budget has denied its necessary approval for the political editorial rule and has asked the FCC to "amend or rescind" the requirements. The rule, however, is seen as having the firm support of Congress.

The political editorial rule requires that a station notify candidates when it endorses or opposes them, and also give them response time. The OMB said it had decided to kill the rule on the basis of the Paperwork Reduction Act, saying that the regulation should be eliminated because the benefits do not justify the burden on broadcasters. The FCC has responded by pointing out that it had started a proceeding in 1983 to examine just those issues and that it would give full consideration to the OMB when a decision is reached. The commissioners can retain the rule by a majority vote.

The White House action appears to be an attempt to find a quiet way to kill the rule, but Congress—whose members would be affected by the rule's deletion—has made clear that it holds a firm opinion on the issue. Specific instructions have been attached to FCC funding in the past to leave the rule alone.

FMer Gets OK for Translator Programming

A remote Alaskan village has been allowed by the FCC to air local programming on a translator. The National Federation of Community Broadcasters (NFCB) described the action as a "ground-breaking" decision.

The translator repeats programming from KRBD-FM in Ketchikan, AK, and now the island village of Klawock will reportedly add two hours a day of local programming. KRBD is said to have plans for covering the region in this way.

Two Additions to Business Software

A new microcomputer software system for television sales and research has been introduced in a joint marketing arrangement by Jefferson-Pilot Data Systems of Charlotte, NC and SoftPedal, Inc. of Atlanta, GA. Separately, Data Communications Corp., Memphis, TN, announced it has added radio and television consulting for business automation.

SoftPedal's new software system, named Sally, is an avails and packaging system that offers automatic packaging, interactive package editing, screen avails and share trends, and book editing.

Data Communications Corp. has set up its new consulting service for stations which want help in streamlining their business operations and in coordinating automation between departments. The consulting service will also assist them in learning how to use BIAS features.

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At the Fall SMPTE Conference in L.A., Merlin Engineering demonstrated the most comprehensive concept for Intelligent Machine Control, specifically structured to the needs of broadcast television, teleproduction, cable master control or satellite switching.

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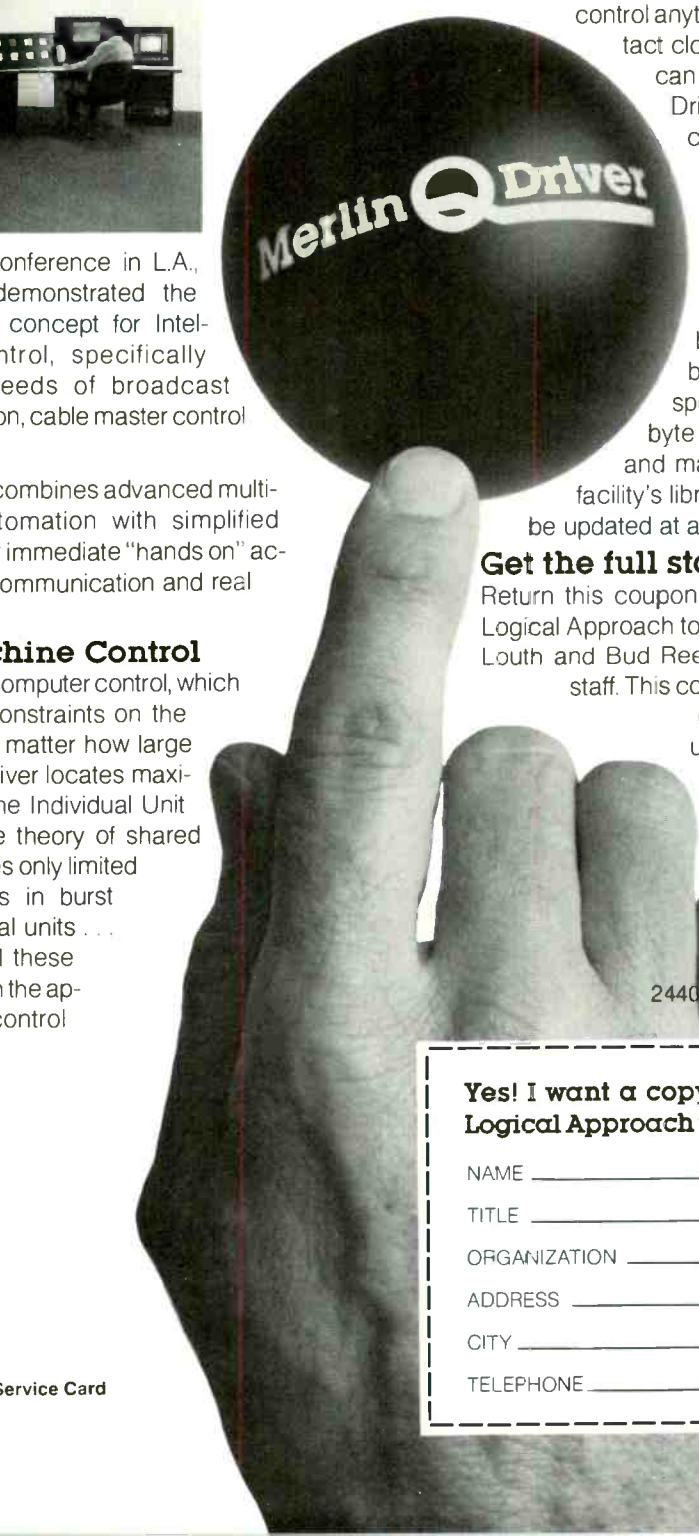
Instead of centralized computer control, which places serious time constraints on the Central Processor no matter how large or fast it may be, Q-Driver locates maximum intelligence in the Individual Unit Controller, utilizing the theory of shared processing, and passes only limited command sequences in burst strings to the individual units . . . which in turn expand these limited commands with the appropriate machine control functions.



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AM Stereo

Only home games are being miked for stereo, and the audio is sent through stereo land lines. Away games would be too expensive to do in stereo, Morris says, because it would mean an additional satellite channel for the second audio channel.

WGN doesn't pan the stereo left or right to get added effects, and Morris says the station prefers to use a low-key approach in using AM stereo during the games.

"All we're trying to do is give you the sound as if you were sitting there at the game yourself," he explains.

Although the Bears football games are not actually miked for AM stereo, Morris says a two-hour special pregame show is carried in stereo.

The show is done from a 29-foot custom-built mobile studio, which has a wall of glass on one side. Talent can work inside or outside the booth; on the inside there are four mic positions. During the show there are musical performances, chats with fans at the game, and contests. Morris says the show is not specifically miked for stereo, but is mixed with balanced stereo lines fed into the transmission.

According to Morris, there are plans to keep on experimenting with stereo at sports events, and he speculates that a potential Superbowl spot for the Bears could prompt even more use of AM stereo, even to the point of transmitting on two satellite channels.

At KSL in Salt Lake City, the sport is NBA basketball with the Utah Jazz.

KSL, using the Kahn stereo system, is a music station most of the day, but decided to make use of its AM stereo for sports to compete in its marketplace. Its sister station, KSL-TV, is a stereo TV station, and was planning to carry Jazz games in stereo. Miking them for stereo effects on AM seemed the logical thing for the station to do.

Randy Finch, assistant chief engineer, says mics are placed near the basket hoops themselves; shotgun mics are pointed toward the floor at the basket end.

"It's quite a shock when you can hear the ball bounce off the hoop from just one speaker, and the sound of the ball shifting as it travels down the court," Finch says.

KSL also does not do any panning or mixing effects, but simply uses a hard right and left, with both the announcer and color man in both.

Finch says the station has gotten some calls from listeners with AM receivers.

KSL's audio is on stereo satellite, because the station had an extra satellite channel of its own to transmit the games. But next season, according to Finch, KSL hopes to get a satellite feed from Brigham Young University, where the Jazz games are played, or use a repeater or STL because of steep mountains between the university and the station.

KSL plans to continue carrying stereo basketball, Finch says, and is thinking about carrying college football from Brigham Young University next season, also in stereo.

Los Angeles station KABC is a news/talk station, but like its sister station, WABC in New York, it has been using Kahn AM stereo, mostly for sideband modulation. But to carry baseball games at Dodger Stadium, the station decided to put the stereo to good use, according to Art Sterman, manager of radio engineering.

Sterman says the crowd is miked with two shotgun mics, one pointing left, one right, and there is another mic behind the plate, he says, "for the crack of the bat."

"When you listen in stereo it sounds like you're sitting with the announcer," Sterman says.

One of the crowd mics is hard left, one hard right, and the mic behind home plate is centered on both channels, according to Sterman. Unlike the other AM stations carrying stereo sportscasts, KABC does not mic the announcers for stereo but instead sends the play-by-play and color out as mono signals.

Another AM station using stereo for sportscasts is WMAL in Washington, DC, also on the Kahn system. Chief engineer J.B. McPhierson says the station carries all home football games of the Redskins.

"Mostly we mic the audience for ambient sound," McPhierson says.

There is a left and right mic, and the play-by-play is in the middle on both channels, with color announcers panned slightly left or slightly right, to avoid a hard left or hard right ping-pong effect.

McPhierson says the station designed its own stereo field console to carry the football games. It's set up with pan pots to help create the stereo image, McPhierson says, as in the slight panning of the color announcers. However, the crowd, according to McPhierson, is not panned for stereo effects but simply separated to give the feel of being at the game.

Lack of receivers

Even the stations using AM stereo for sports programming are reluctant to overpromote it because of the lack of receivers.

"It's been a frustrating sort of thing," WGN's Morris says. "We were involved in a market promotion for stereo, and we were really disappointed in the results."

Instead, it seems that the idea to broadcast sports in stereo just seemed logical, since the games were being carried anyway. Many stations are not even miking the crowd with separate left and right channels, but are simply carrying two channels of the same audio signal.

Stations that are musically formatted when they are not carrying the games seem a little more comfortable with the idea of stereo effects, while news/talk stations seem very much against miking talk shows or newscasts, because of previous failures.

"From my experience with FM, I'm not going to put the caller on one channel, and the host on another," says KABC's Sterman. "If you listen in stereo, especially on headphones, it can drive you crazy." Sterman points to early experiments with FM talk shows, where a host on one mic and a guest on another led to ping-ponging.

Morris says it's important to use the stereo effect sparingly.

"All we've done is try to simu-

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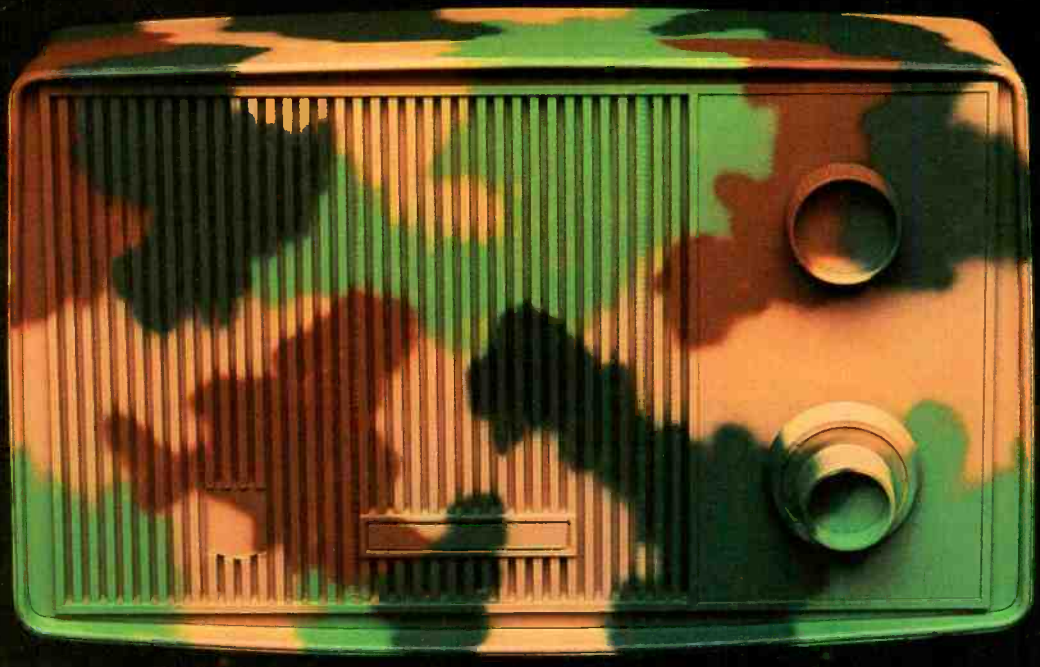

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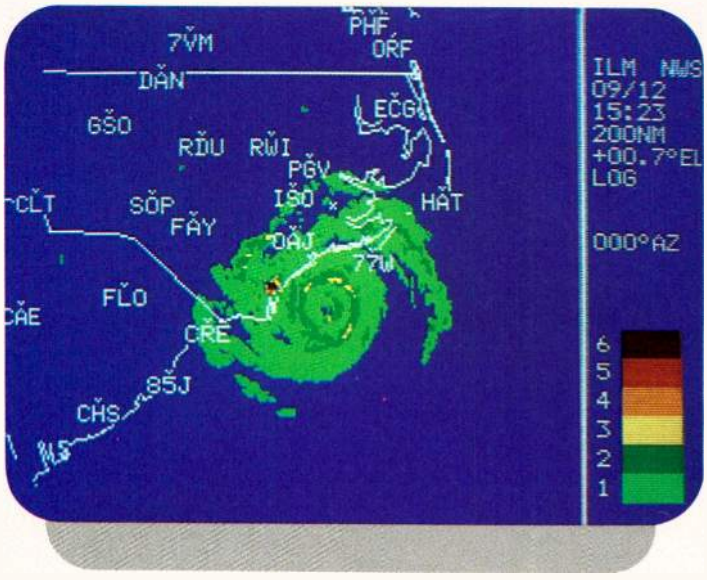

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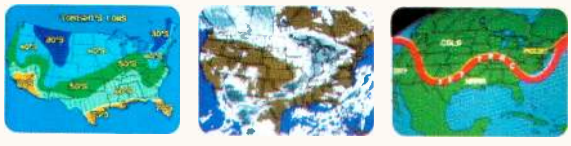

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late what the listener hears," says Morris.

"One of the things you have to be careful about in stereo is not to make it an acoustical gimmick. Basically, one speaker doesn't sound as good as if you hear it in two ears. We have to worry about not degrading the mono signal."

Broadening the support

The positive feedback, even in small doses, that AM stations get when they experiment with stereo during sports events shows that it might be something AM could do to get back listeners, without worrying about carving up only the music audience. But some strong support for AM stereo is still needed, and it is about to come from a group owner with some clout.

Westinghouse Broadcasting, or Group W, has already converted WBZ in Boston and KDKA in Pittsburgh to AM stereo on the Motorola C-Quam system, and Glynn Walden, engineering manager for Group W's AM stations, says WINS, New York, KYW, Philadelphia, and KFWB, Los Angeles, are all slated to go stereo as well, along with KMEO, the group's newest AM acquisition in Phoenix. WINS, KYW, and KFWB are news/talk AMs, but Walden says it's too soon to speculate how stereo might be used once the stations convert. He does maintain that it would not be used for news and talk shows.

"We tried it with FM when it first started. But there was a loss of loudness for the mono listener in FM, so it didn't go over well," Walden says, although he doesn't know if the same would be true for AM stereo.

Walden says Group W is interested in AM stereo as a way to provide better quality AM.

"Our main interest in promoting AM stereo is first to promote AM, then to promote better quality AM radio," Walden explains.

He says there has been listener response to AM stereo, with calls coming in to WBZ and KDKA almost as soon as the stereo conversion was complete. But he believes stations must take the lead in stereo, because "you can't wait for the receivers to be out there."

Most AM stations who convert to stereo transmission are probably doing it with a music format, and hoping to reach parity with FM fidelity and get back some of their dwindling music audience. But nonmusic stations and music AMs carrying sports may find some modest stereo miking and mixing will give an added edge in a competitive market, feeling that as long as the games will be aired anyway, they may as well have the best audio available. **BM/E**

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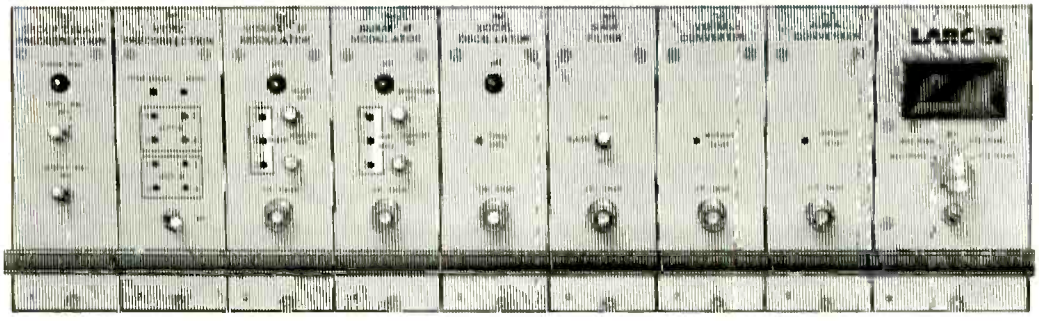

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FM Production Benefits from Multitrack Techniques

As multitrack facilities become more commonplace in FM radio stations, using them to their best advantage takes time and an increased awareness of the nuances of radio.

By Don Elliot, Production Manager, KIIS-AM/FM

Successful, competitive audio production is the result of an awareness of flow and punctuation that is pleasing to the ear. It sells by getting its point across with an impression. Recently, it's become possible to employ more varied techniques to achieve such results, and one of the more creative of these has been borrowed from recording studios.

Multitrack facilities are becoming more commonplace in FM radio stations, but using them to their best advantage—and to the benefit of the station—is something that takes time and an increased awareness of the nuances of audio.

Certain ground rules can help give a station a consistency in its production results. Artistic purists at one end of the spectrum may work endlessly on a piece of production with no end product. On the other end are those producers who must "grind" out 15 retail spots a day for the local used car dealer. The ideal is to be able to work somewhere in between.

Don Elliot, production manager of KIIS-AM/FM, in his home multitrack production studio.

The equipment

It seems simplistic to remind audio producers that they should get to know their equipment, but with increasing use of state of the art multitrack recorders, it's become more important .

Most stations already have a multitrack recorder and don't even realize it, because they've never thought of their stereo two-track as such. But whether a station owns the latest model eight-track with all the bells and whistles, or the same reliable two-track that has stood in the production studio for a few years, it's possible to use multitrack techniques to increase creativity and productivity.

There are many advantages to multitrack recording. Even the fastest reel-to-reel editing and assembly techniques can't compare with the smoothness, ease, and speed of multitrack production. The basics apply whether the recording facility is a two-track, four-track, eight-track, 16-track, or more. A segue from one track to the next is as

About the Author:
Elliot, a former morning jock, is currently production manager of KIIS-AM/FM, Los Angeles. He also produces TV theme music and jingles, is the voice of many radio ads, and is producing an LP of song parodies as one member of the group "E.E.G.A.D."

basic as using two channels of two-track. One asset the machine must have, however, and most do, is a feature known as sel-sync, sync, or simul-sync (MCI calls it "cue"), which allows the monitoring of sound from the record head.

Since there is a sound delay caused by the distance between the record and playback heads, sound-on-sound techniques are impossible without this feature. With it, you can play back the original track and record a new track on the record head simultaneously. Thus, the two tracks will be lined-up, and both will be reproduced without sound delay. The end result is the elimination of the need to splice parts of the production together, or record them again onto another tape, thus avoiding generation loss.

Multitrack recording techniques require the use of a multitrack console. If the station does not have one, there has to be some way to bring the sync output of the machine back independently of the record bus of the console for monitoring purposes. This could be done by using a sub or auxiliary mixer such as those made by Fostex, Shure, Tascam, and others.

Two-track creativity

Multitrack recording with sel-sync is relatively simple and can become second nature in a short period of time. The first section of the piece is laid on track one. The tape is rewound and played back in the sync mode through the monitor. Track two must be on "input," so you can hear what is going to be added in sync with what has been previously recorded. You can push "record" at any time because switching the first track to "sync" and "safe" protects the first track recorded. When you hear the end of the first section on the first track, the next track, which is already recording, can be laid down, either overlapping or adjacent to the first section. You can carry this on indefinitely, alternating tracks, which are finally combined and mixed down to a master tape or to a cart. One area where this technique can prove useful is in reassembling "loose" agency spots or "piggybacks."

Mixing down requires summing the output of a two-track, or bringing in each track on a separate pot on the console.

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Time	Track 1	Track 2	Track 3	Track 4
:00	Music, Section 1	"This weekend..."		
:12		Voice Q: "...this weekend only."	New Music, Section II	
:18		Q: "...at the antique car show."		Sound Effects of antique car horn.
:22		Q: "...dealers all over So. California.		
:25	New Music, Section III hits for fading live-over, pad to :30			

A legend sheet showing time, in-, and out-cues helps organize tracks for multitrack recording.

Using eight-tracks

The methods used for two-track recording can be applied to eight-track production as well. Producing on eight-track will usually be more complex, such as spots calling for several voices.

When you're building up tracks, usually you can begin by doing splice edits needed for effects or music on ¼-inch, especially if it means tailoring a music bed to fit copy, creating a loop, or a series of effects. The ¼-inch tape then becomes another source of audio like a cassette or live voice to be laid on a track. Doing the editing on ¼-inch lets you tailor it to the spot.

For the eight-track recording, I usually start with the first piece of music, which I lay on tracks three and four (two tracks for stereo), and then lay the next piece of music on tracks five and six. It's better to use the center tracks, instead of the edge tracks one and eight, when you're working with music. The reason is that music requires optimum quality, and anything with a super high end such as bells or cymbals, or with heavy transients or dynamics should be recorded on center tracks, which have the superior alignment. The edge tracks also generally are the first to suffer wear and tear.

Continuing the example, the first voice track is recorded on track two. Then a sound effect is brought in on track one if it's mono, tracks seven and eight if stereo. If you get in the habit of using the same tracks for the same segments, such as music on three, voice on two, you will be organized, and it will be easier to remember once the recording is done. Or you can use the legend sheets mentioned previously.

Benefits of multitrack

In addition to the added creativity, there are lots of cumbersome problems that can be avoided by working with multitrack. One is the ability to update.

For spots that are time-critical, you can keep the same music, effects, and general copy, but if the portion with the date, or time reference—such as "sale ends tomorrow"— is on its own track, it

can be rerecorded with different dates or references. It's important, however, that the two phrases take up the same amount of time, and that you make use of the selsync feature to get the phrase to come in at the right time.

The same can be said of mistakes. If you flub the copy, or make a mistake with the effect or music, and each is on a separate track, there is no need to go back and recut the entire piece. You only have to go back to the one part and rerecord it, again monitoring it to keep the timing right.

Another advantage to multitrack is the ability to build a sequence, or "paint a picture." You can lay sounds on separate tracks which, when played back, create an overall effect. You could create a "party," for example, by recording background talk on several tracks, perhaps several times, depending on the loudness and size of the crowd desired. Ice tinkling in glasses can be added on a separate track, and perhaps very soft background music on another. Finally, your announcer's voice will be louder and panned to give the effect that he's at the center of the party.

Another place where multitrack is important is in adding EQ, compression, or other technical effects such as reverb. Each track can be equalized or compressed separately, and those effects, along with reverb, can be added only to the segments of a piece you want to emphasize, such as the announcer at the party in the example above. The same is true of panning.

When mixing these effects, I close my eyes because I try to feel it.

It's important to immerse yourself in the sound and to become aware of the nuances. Pannings and level can create the effect, but you really are painting a picture. You can't do it by formula—you have to do it by feel. The same is true of rhythm. Timing is more than just using a stopwatch. You have to get the rhythm, the dynamics, the contrasts and bring it all in on the right beat. In creating dialog, I use different levels for different characters.

One additional word about rhythm. I don't usually use a time code track unless I'm mixing audio for video or film. I also use it occasionally as an autolocator, because it lets me preselect a "punch in" and "punch out" point, which is especially valuable in updating spots the way I outlined above. I think that rather than using time code, a producer has to rely on his or her own sense of rhythm, and even when using a time code track, I find that there's a rhythm that has to be "felt."

All these techniques can be employed, but the final quality of the production is as much a function of the producer's inherent aptitude. It's better to teach a philosophy of production than technique. BM/E

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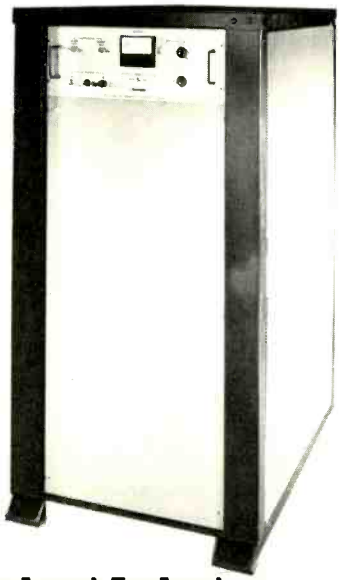

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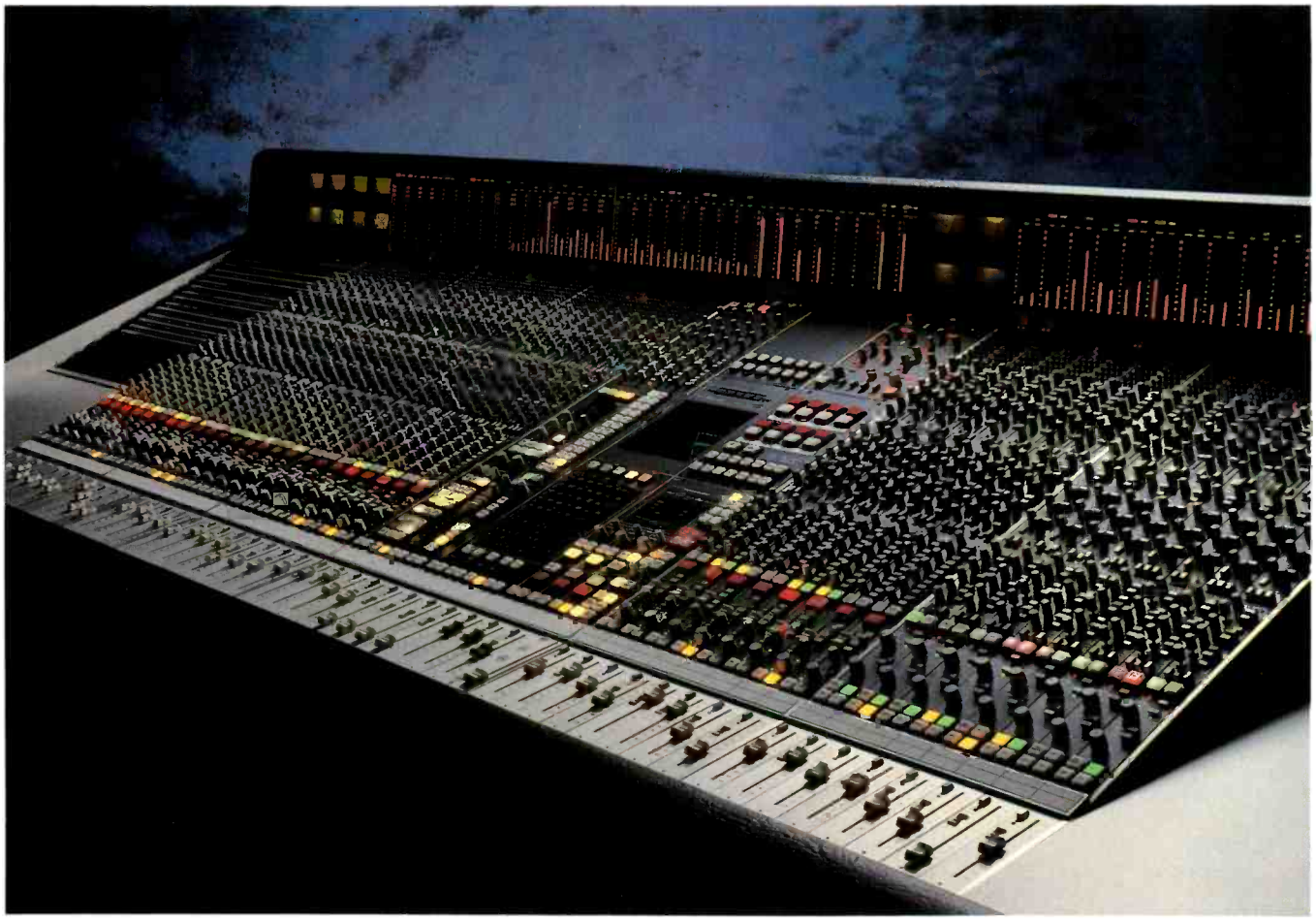

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Redesigning TV Sound: From Burbank to Brooklyn

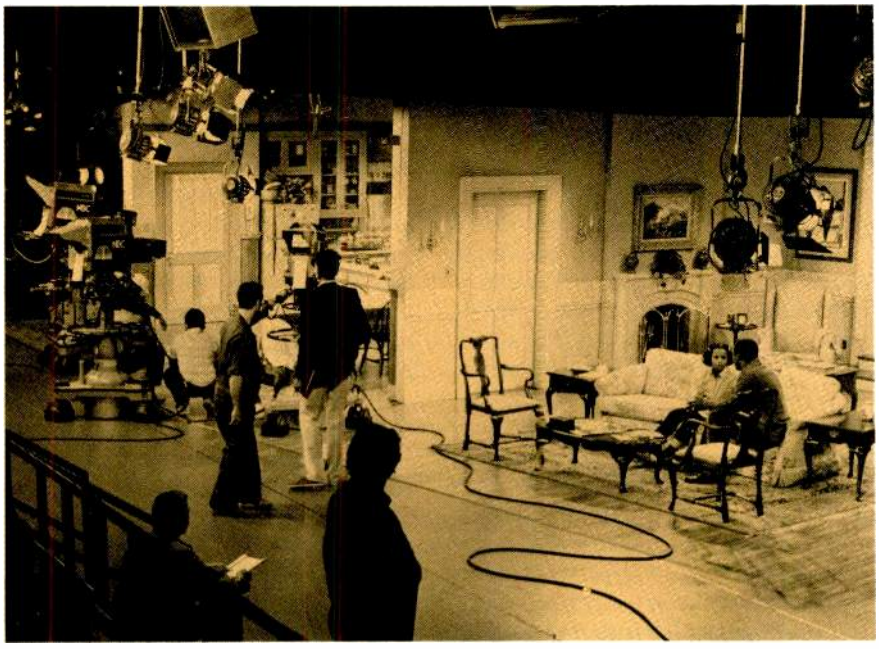
Encouraged by the success of its stereo sitcom The Cosby Show, *and by a new focus on audio, NBC has borrowed acoustic design techniques from the recording industry to enhance its audio.*

By Judith Gross

When NBC decided to launch comedian Bill Cosby's idea for a sitcom, the network was faced with some immediate problems of logistics. Its star and creator is an east coast resident who would rather work in New York than in California, where NBC's other half-hour comedies are produced.

But where in New York to house a full-scale production was a concern, since studio space was scarce, and the nature of the show required a live studio audience.

NBC finally settled on an old sound stage in its Brooklyn building where the soap opera *Another World* was taped each weekday. The set was a huge, vacant stage that had been used for live variety shows in the 1950s, and it had its share of technical imperfections. But, at that time, no one knew what a hit *The Cosby Show* would become.



The set and live audience section of *The Cosby Show* soundstage at NBC's Brooklyn facility had to undergo acoustic improvements for the show's stereo sound.

It wasn't long before the popularity of the show, and the attention to detail of its star and staff, meant that some changes were in order, the first and foremost of which focused on the show's audio.

NBC, in its commitment to MTS, has brought a whole new awareness of audio to the world of television. To improve the audio quality of *The Cosby Show*, which is produced and broadcast in stereo, it turned to the tried and true techniques of acoustic design for the recording industry.

The network had already set a precedent in the area of new sound design for TV in its renovation of an audio post-production room at its Burbank facility. PPS 1 (post-production sweetening one) had been planned and constructed to the recommendations of Chips Davis Acoustic Design. Davis was one of the first to use advances in acoustic measurement and new principles of design created for recording studios and apply these to TV audio environments. NBC hired Davis as a consultant, to rework the audio facilities in Brooklyn and to improve the audio quality of *The Cosby Show*.

NBC's Post-Production Sweetening 1 in Burbank makes use of techniques worked out by Chips Davis Acoustic Design.

State of the art acoustics

The principles applied to the design of both PPS 1 in Burbank and to audio control for *The Cosby Show* in Brooklyn are referred to as "live-end-dead-end acoustics." (LEDE is a trademark of Synnergetic Audio Concepts. Acoustic environments not certified by them can be called LEDE-type or style, but are not actual LEDE rooms.)

LEDE-type rooms are basically anechoic, minimizing or eliminating reflections from the surroundings that can feed into the audio and mix with the recorded sound. The design was made possible by the ability to do precise measurements with Time Delay Spectrometry, or TDS. TDS looks at the frequency spectrum of the direct signal or any reflection of the direct signal while discriminating against all other energy present in the room. It is also important to do an energy time curve, showing the direct signal and its reflections with respect to time and intensity.

The ideal, in creating an LEDE-type room, is to create a "Haas zone" with the initial reflection from the direct sound off the rear wall of an acoustic room rendered inaudible, and to have any energy remaining after those reflections decay evenly over time. A Haas zone is based on the Haas effect, which occurs when the human brain masks echoes and delays of sound that arrive approximately 10 to 20 milliseconds after the original or direct sound. Basically, a room using these principles of acoustics will not have any reflections or reverberations feeding into and coloring the final audio product. What is heard in such a room will be accurate to the sound recorded.

Some of the design criteria that are necessary to create such a controlled acoustic environment have to do with the physical characteristics of the room itself; others with the integration of audio equipment within the room.

The inner shell or shape of the room must be symmetrical; rear walls and rear side walls must be solid, and distanced to provide interwoven comb filter patterns that will diffuse and fall within the Haas zone. Speakers must be time-coherent and placed at correct spacing from each other and at correct angles to the audio mixer. There must be an effectively anechoic path between speakers and the mixer's position. The console must be placed so that reflections of sound from it doesn't interfere with the desired anechoic path. Correct power amps are needed to control the complex speaker load and have the headroom to reproduce without peak clipping. All audio equipment must be correctly interfaced and grounded, and the polarity of the entire audio chain must be correct.

The list of criteria is long, and is the most crucial in recording studios and other acoustically precise environments. The use of such precise design criteria is a new phenomenon in TV sound, and is important for MTS.

Sweetening the audio

Construction of what is now called PPS 1 in Burbank began in March of 1983 and was completed in April of 1984. NBC was using what is now PPS 2 for post-production sweetening. The oddly shaped (trapezoidal) asymmetrical room with standard ceilings and standard fluorescent lighting was not giving a true audio sound, and mixers were complaining that when audio was taken out of that room, it didn't sound the same elsewhere.

The new PPS 1 incorporates many changes. Three layers of 5/8-inch drywall was used for ceilings and walls, because, Davis explains, solid walls minimize the possibility of reflections. The walls are parallel at critical distances, and are laser-measured.

Davis says one problem was that the network was only able to allow a predetermined space for the room, and there were obstacles he had to overcome. The ceiling initially sloped down towards the back, and there was a support pillar in the back of the room as well.

"We had to space the room out to get a pretty evenly defined bottom end, for the low frequencies," Davis says, adding that the resonancy of a room is determined by size. In PPS 1, Davis couldn't adjust the width, but he did adjust the length with respect to where the speakers were placed. He also angled the ceiling up away from speakers, and he adjusted the angle of speakers to the mixing position with a 60 degree angle, and a 12 to 16 degree vertical angle. Davis says this is the best entrance of audio into the ear.

The Davis design uses three time aligned or phase coherent speakers, one left, one right, and one mono (L + R). For the speakers on the console bridge, he uses more powerful amps.

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The audio control room for *The Cosby Show*, at NBC in Brooklyn, benefits from the same acoustic principles as the network PPS1, located in Burbank.

"I never drive those speakers with less than 100 watts, and I try to get everybody to use 250 watts," Davis says. "You don't want to run out of headroom, and you want to be able to control the speaker." He maintains that a more powerful amp will cause a speaker to sound different than a smaller one.

Davis said he had to move the console in PPS 1 closer to the speakers because of length of the room. As with most of the design decisions made, Davis says "It was an optimized compromise."

The final layout of all planes in the room are from the mixing position to an accuracy Davis says is 2.5 seconds (as in degrees, minutes and seconds).

To finish the design, one inch of cloth-covered fiberglass was used on the console bridge, to soften hard spots in the room where reflections can be caused. Davis says the finished product is different from a more "plush" listening booth.

"We're not making a listening room, which should be very pleasant, but a control room with a neutral environment, so that what's being recorded is what you actually hear," says Davis. He adds that audio that sounds good in PPS 1 can sound good anywhere, even on smaller speakers.

Equipment in PPS 1 includes a CMX editing system and Ampex recorders—an ATR-124 24-track, an MM-1200 16-track (backup multitrack), and ATR two- and four-track machines. All ATRs are CMX-controlled. The main console is a 40-input, 24-bus Quad-Eight/Westrex Cornado. There are also two 16-channel Yamaha M-916 boards, used mainly for mixing effects.

PPS 1 isn't only used by the network. NBC attracts outside clients with its state of the art design. In fact, demand for its use is so high, that NBC has asked Davis to work with PPS 2 (the former PPS 1) to try to maximize its acoustics.

Audio for a number one show

Three months after the launch of *The Cosby Show*, when it was clear that NBC had a success on its hands, the network decided to make some changes.

The old soundstage was a problem, especially for Cosby, who thrives on a live audience reaction. The audience sound was getting lost in the huge space, and the set sound was traveling up over the overhead pipes and blending with the audience sound.

In addition, the audio control center was an open space in a corridor adjacent to video control, and extraneous sounds and audio reflections were making the mixer's job more difficult.

NBC once again called on Davis, who was able to convince the show's staff that changes were in order when he replaced limiters that were changing the whole timbre of the audio. The next step was to make some temporary changes to get the show through its first season, before a complete redesign could be undertaken. The audio control room was eventually renovated when the show went on summer hiatus.

In the new design, Davis made many of the same changes to the control room that he had to PPS 1 in Burbank.

He rewired new speakers, again time aligned speakers, and placed them in the precise positioning required for the anechoic effect. He enclosed the room with solid walls. As with PPS 1, Davis says there were compromises that had to be made—the main one involving the all-important mixer's position. Davis says he would have placed the mixer further back from the console, but it was important for Rich Jacob, the show's audio mixer, to be able to see the show's director through a glass booth in the front of the room. That meant the mixer had to be closer to the front, and Davis had to reangle the speakers. There is still a slight problem with reflections from a rack to the left of the main console, which Davis says he intends to address. But overall, he says the stereo image within the room is "superb," as is the frequency response.

The massive set and live audience represented another set of audio problems for the show. Joseph Kolb, manager of studio operations for Brooklyn, says that baffles had long been removed from pipes overhead. These were replaced, to stop the bleeding of audio over the set and into the audience, and to get rid of what Kolb calls "slap-back": the bouncing of sound into the audience and back.

Portions of the set had to be modified with respect to audio as well. Steps in the "living room" were initially hollow, but they have since been insulated for a more solid sound. To help further

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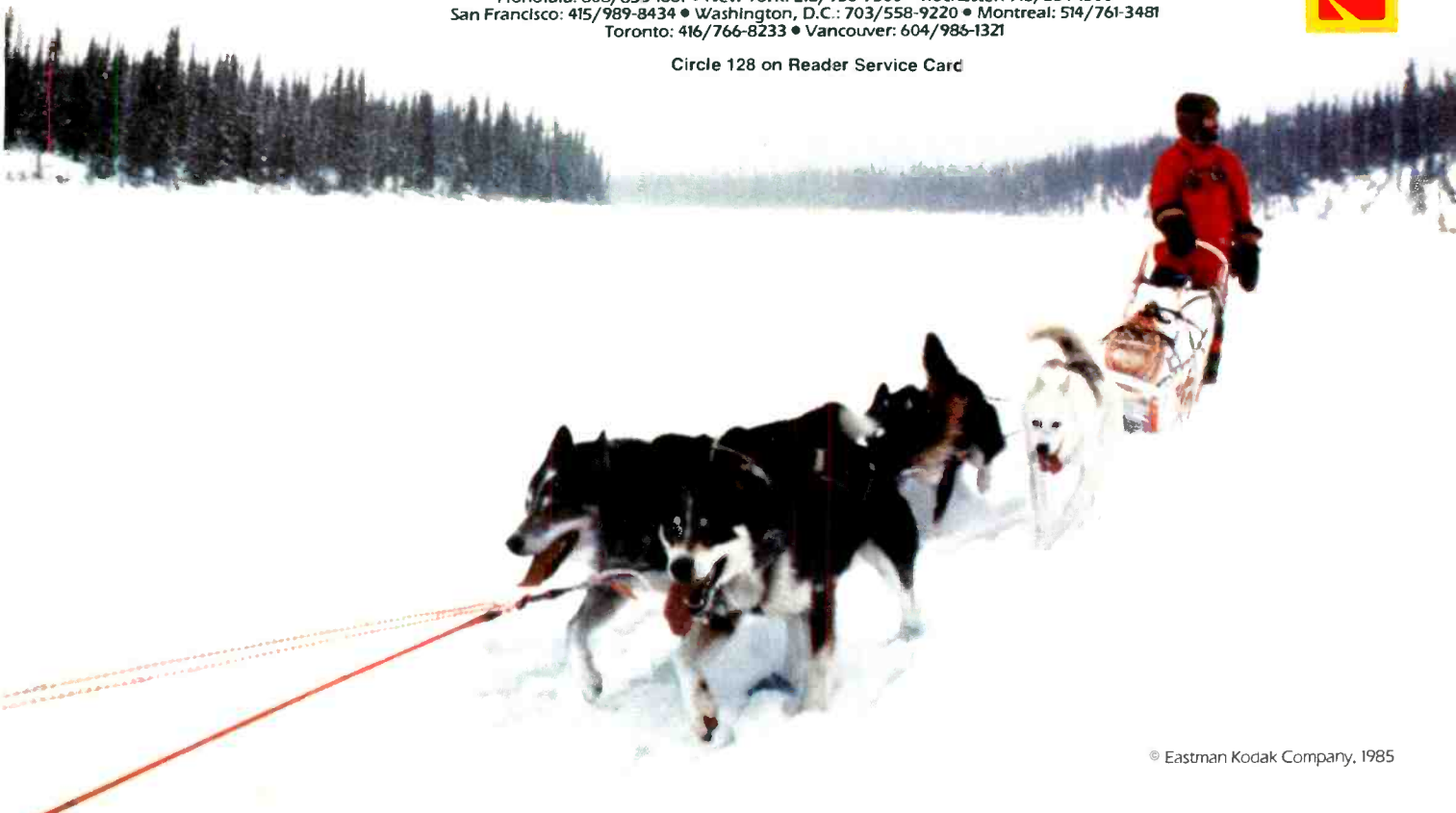

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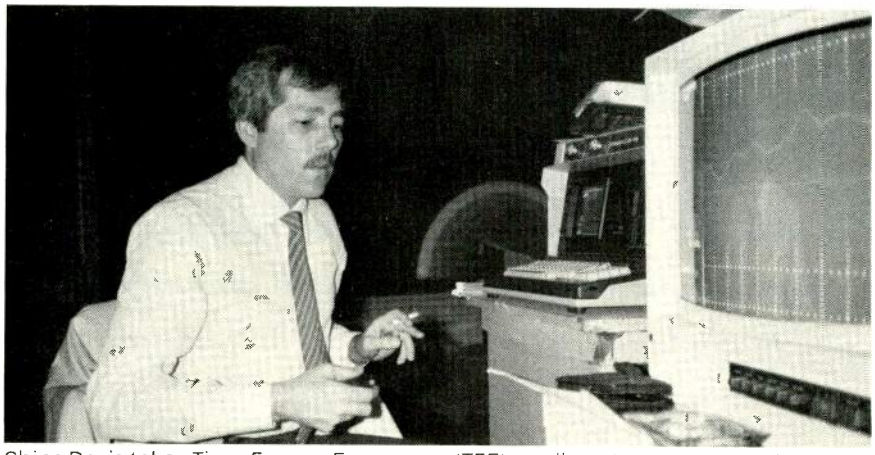

Chips Davis takes Time Energy Frequency (TEF) readings to measure early sound reflections in an NBC facility.

separate the audience sound for the stereo mix, black velvet was placed in front of the audience seating.

Stereo mix

Veteran sound mixer Jacob is pleased with the finished audio booth.

"Acoustically, you want to hear if what is coming out of that speaker is actually being recorded for the show. Anything can sound okay in the headphones, but with the speaker you really know how it's going to sound," Jacob explains.

He says the room has been "damped down" and is more solid sounding. He also says the lack of reflections and extraneous noise makes his job less difficult.

"One of the things you notice is the lack of ear fatigue; everything is so flat and easy to listen to, you don't get tired as easily," says Jacob. "I've worked on some sitcoms where after several hours your ears are ringing."

The set of *The Cosby Show* is not miked for stereo, but the audience is. The stereo mix, according to Jacob, is done during post-production at Compact Video on the west coast, where most NBC stereo sitcoms are done.

In the Brooklyn audio booth, Jacob uses a Solid State Logic 5000 board for mixing, and he also records separate tracks of audio for the audience mix.

"Most sitcoms are doing limited stereo, not with dialog," Jacob says. "They split the audience left and right, and add music and effects later."

He says miking for stereo is difficult, and that in television it's still a new phenomenon.

"The idea of stereo is to add space and dimension, and panning stereo across so small a screen as most TVs it's hard to get the feeling of space," Jacob notes. He also points out that the director would have to call camera shots with stereo audio in mind, and that a complex stereo mix would require longer post-production time.

"It will be a while before we do complete stereo," he maintains.

In fact, the decision not to mic the set in stereo on NBC's sitcoms was a conscious one, according to Mike Sherlock, network executive VP of operations and technical services.

One of the procedures that is done differently for stereo, Jacob notes, is the laugh track. In mono, he says, it was placed very close to the punchline, but in stereo, it is set "further back," to create a feeling of space.

The dialog of *The Cosby Show* is hard middle, Jacob says, and is recorded onto one track which is split into balanced stereo in the mix. The set is miked with the traditional booms.

There are 12 mics on the audience, and these are separated for stereo, with three lower right, three lower left, three upper right, and three upper left. A "center" audience is added in the post-production mix, Jacob says.

On the videotape, two audio tracks are recorded, with the set audio on the top track, and the audience on the bottom.

Four audience tracks are recorded onto a separate tape using an Otari half-inch four-track machine. There is one track for the set audio, one track for the left side of the audience, one for the right side, and one track for time code. Any sound effects done on the set, such as doorbells or phones, are placed on the audience track. Other effects are mixed in during post.

Audio's rightful place

NBC likes to characterize the renewed emphasis on audio that came about with MTS as "audio regaining its rightful place in television."

To Kolb, it represents a major change.

"Audio has always been relegated to a lesser role in TV, sort of an 'oh yeah, we've got to get the boom in there.' There's a new awareness of the sound, brought on in part by the introduction of stereo," Kolb says.

Sherlock agrees.

"We've always been aware that TV audio has been somewhat a stepchild of TV. We felt that now that there was a de facto standard in stereo, we have an opportunity to improve the audio," he says.

Sherlock also explains that better audio is not limited to *The Cosby Show* or PPS 1 in Burbank, but is part of a larger plan, although he acknowledges that Cosby's success has given the move toward improved audio an extra push.

"We had an old facility there. Neither we nor the *Cosby* folks wanted to have our top show with outdated audio."

NBC is now looking at the same design acoustics to update other control rooms and to construct new production facilities in Burbank. It's one more sign that TV production is starting to look at audio as a product on par with video, and as Sherlock points out, "stereo is a better quality product." **BM/E**

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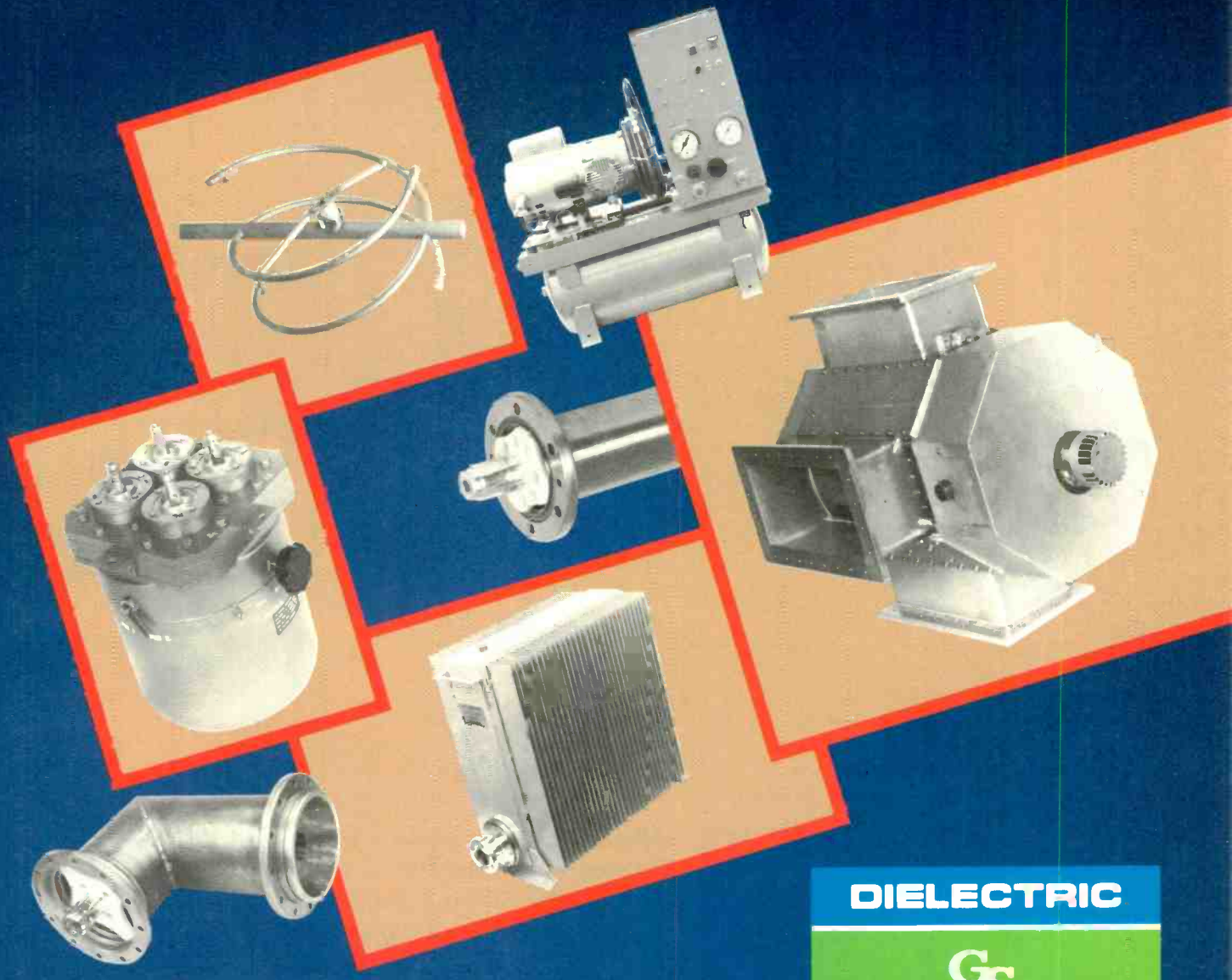

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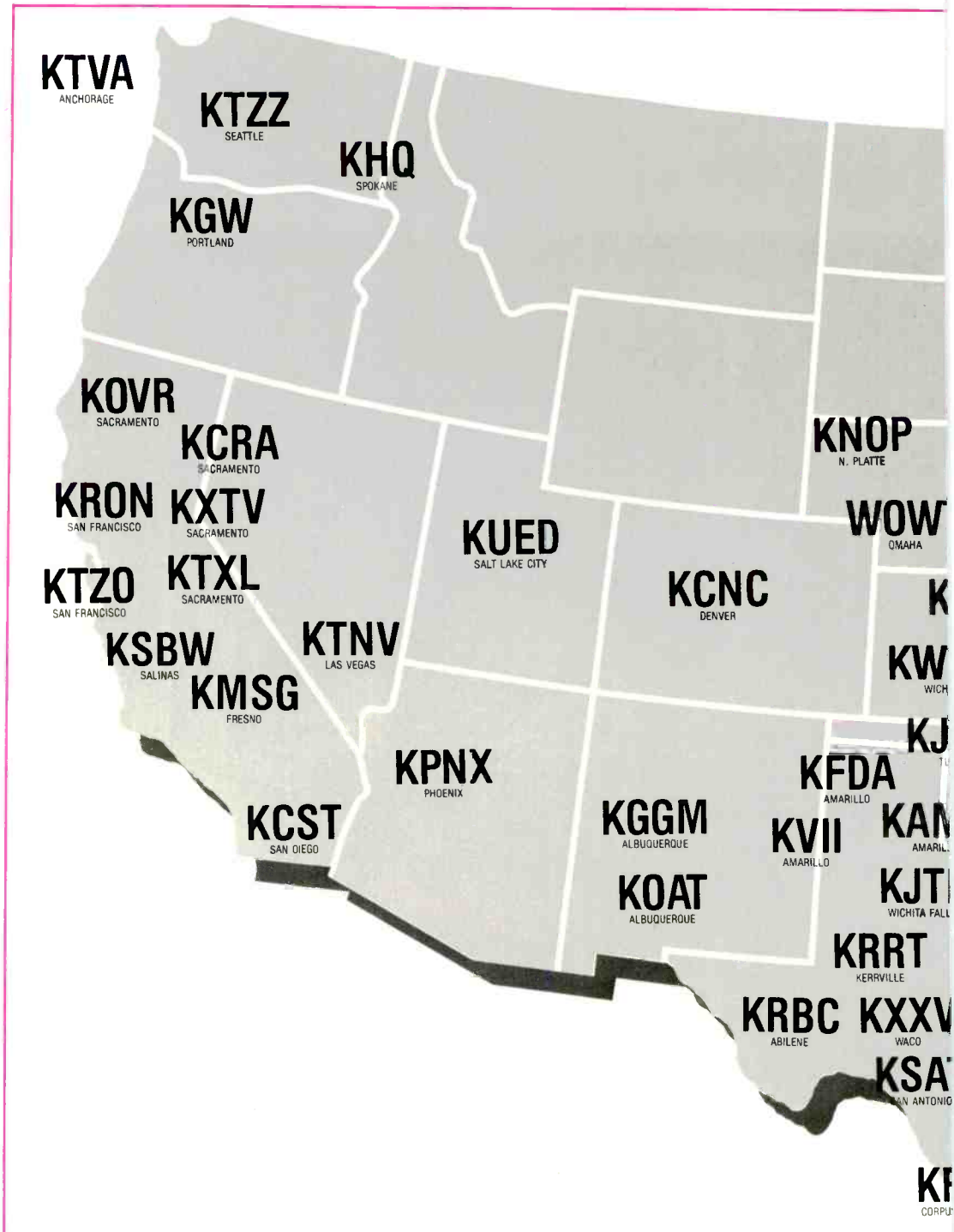

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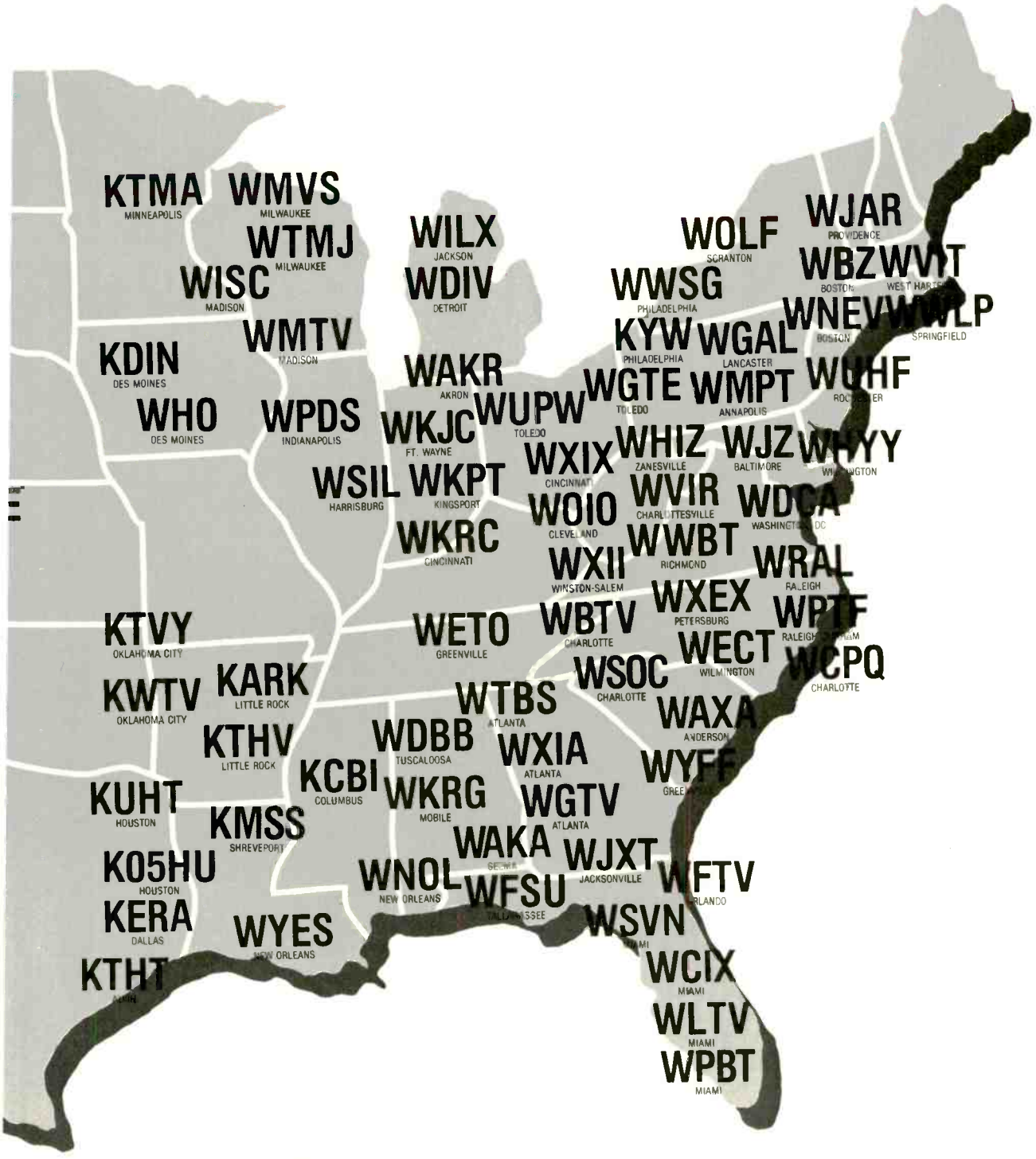

ORBAN'S FIRST 100 STEREO TV STATIONS ARE NOW ON THE MAP.

Deregulation, New Technology Bring Changes in Radio Transmission

By Judith Gross

AM radio is attempting to resuscitate a fading audience with stereo and better quality audio. Digital audio and solid-state transmission are two high-tech innovations that are changing the way things are done in both AM and FM, and FM applicants are struggling through the paperwork involved in the 80-90 docket resolutions, while some already established stations are putting aside their competitive spirit and sharing antennas.

The transmitter industry stands to gain from the new climate, not only in increased sales, but in the design and performance improvements that will result as radio broadcasters aim for better quality.

Deregulation

This is the year Docket 80-90 comes to fruition. It will be a while, most industry insiders believe, before the new stations that will arise from the mass of paperwork have any great impact on the marketplace. Nevertheless, new FM stations, stations seeking upgrades before the "freeze" deadline, and those who opt to go the community antenna route will all be reevaluating transmission needs in the coming year (see box).

On the AM side, stations are no longer forced to adhere to the old discrete power limitations. Now stations can operate between the discrete "steps"—in some cases this might be the impetus for an upgrade to the next highest power transmitter.

One issue that may have a negative effect for both AM and FM is a growing concern about RF radiation from radio towers, according to Jorgen Jensen, AM broadcast sales manager for Nautel. He observes that some stations have been prevented from upgrading their transmitters, others have been forced to move their antenna sites, and some broadcasters have been refused zoning permits by the local government because of this concern.

There are several other developments of significance to AM stations, which, while they may not have an immediate or dramatic effect, promise to influence the transmitter marketplace. The agreement between the U.S. and Mexico, allowing daytime stations in this country that operate at the same frequencies as Mexican clear-channels to go to full-time power, has been signed but has suffered delays in implementation in the aftermath of the Mexican earthquake. Once the agreement takes effect, some daytimers who have been postponing system and transmitter upgrades will go ahead and make their new purchases and improvements.

Another uncertain area, at least for the present, is the effect of Cuban reaction to Radio Marti, which began broadcasting several months ago. Stations in Florida and along the Gulf Coast have been monitoring their own signals for possible interference from jamming. It's been rumored that Cuba intends to retaliate in some way, and at least one transmitter manufacturer reported turning down a request from the Cuban government to buy an extremely high-powered transmitter. Stations in this country that can show intereference from such possible sources are eligible for power upgrades.

Two other proposals for AM that may have an effect on transmitter buys are the plans to widen the AM dial and a request from some AM proponents that AM stations be allowed to increase their power, perhaps by as much as 100 percent, to compensate for RF interference. Both proposals are being discussed as part of an overall effort to improve the quality of AM radio.

But perhaps the biggest issue entering into AM improvement discussions is the ongoing saga of AM stereo. With about 400 AM stations broadcasting in stereo, the focus has turned away from the systems war and toward the need to encourage stereo as a means of improving AM transmission quality, thus for-

Nautel is currently the only company marketing a 50 kW, fully solid-state AM transmitter in the U.S., shown here in its modular design.

cing receiver manufacturers to improve AM radios. At present, AM stereo has failed to make much of a showing, and transmitter makers generally do not believe it will have much of an impact in the coming year, either, with stations who go stereo simply adding the AM exciter to their existing transmitter. But at least one engineer cited the lack of an AM transmitter that incorporates stereo as a reason for not buying stereo.

"I'd like to see an integrated AM stereo transmitter," he complained.

AM stereo may be a factor, however, in that AM stations with older equipment often discover, on going stereo, that there are problems in other parts of the audio chain, and they may eventually find it necessary to upgrade by buying a new transmitter, among other equipment. If AM stereo doesn't make a stronger showing soon, some believe it will be destined to go the way of quadraphonic stereo. Joe DeAngelo, product marketing manager for radio for the Harris Corp., also believes the failure to embrace AM stereo could hurt the industry.

"If AM stereo doesn't fly, I don't see where high performance AM transmitters will have any place in the marketplace, and it could have a negative impact on the market in the long term if AM stereo doesn't take off," says DeAngelo.

On the FM side, other than 80-90, there are a few other important transmission issues.

DeAngelo expects to see increased activity in the use of SCAs have an effect.

"Older transmitters can't always pass the extra bandwidth needed for additional SCAs," DeAngelo says. "As SCAs become a moneymaker for stations, older transmitters might be worth replacing."

DeAngelo also thinks the increase in the use of CDs on FM stations will cause broadcasters to strive for the same "clean" sound in the remainder of the audio chain, and that upgrades may be necessary to accomplish this.

Two ongoing concerns cited by many in the industry are the traditional need for reliability and the need to cope with higher power costs.

To insure reliability, broadcasters usually seek out transmitter manufacturers with a proven track record.

"Buyers will always be looking at reliability, then performance, and all those things that produce reliability," says Vernon Collins, VP for domestic broadcast marketing, Continental Electronics.

In fact, engineers usally place reliability at the top of their list of things to consider when buying a transmitter. One engineer said he looks for "high performance and reliability," another, "reliability and reputation of the manufacturer."

Another factor some stations are considering is the ability of a transmitter to do its job without constant supervision, meaning partial, or perhaps full automation capability.

"Automated transmitters will be a plus," says Collins, now that more stations are looking at automation in an era when the station engineer's role is shifting.

Concerns about power costs have also led broadcasters to seek out increased efficiency. Recently, solid-state has become a feasible alternative to tube transmitters, and the marketplace has responded with the development of fully solid-

Varied Benefits Docket 80-90 Brings

By Gil Moor, Bromo Communications

Moor is a partner in Bromo Communications, broadcast technical consultants based in St. Simons Island, GA.

Now that the first few Docket 80-90 windows have come and gone and rulemaking requests are being accepted by the FCC, we can assess just how this entire new process is working. So far, many stations have found benefits in the wake of Docket 80-90.

It was clear from the outset that many previously unserved communities would now get their own FM stations. This has indeed taken place, but there is another phenomenon occurring as well. Many existing Class C stations are voluntarily taking the downgrade to C1 or C2 and moving much closer to centers of population. Although a station taking this course continues to serve the original, smaller city of license, its value can increase many millions of dollars when the city grade signal is over the larger market. A Class C station with a center of radiation at 299 meters height above average terrain is still a powerful regional station.

Many AM-only stations have also benefitted from Docket 80-90 by getting the chance to pursue a new FM channel in their markets. Some AM broadcasters, especially daytimers, feel this is a life and death issue for their AM-only stations. Long fights may ensue in some cases when one of the parties seeking a new channel is a determined AM-only broadcaster who is fighting for a new FM affiliate.

The large number of applications being received in Washington is resulting in many being eliminated for technical deficiencies. At one time, a station's local engineer might attempt to file a Form 301 for a new station or even modify the present license. Now, since the enactment of many new FM policies, it may no longer be advisable for the local engineer to attempt such an undertaking. Applications for the Docket 80-90 window stations, if found defective, are returned with no chance for resubmission. Many small infractions can kick out an application, and it is virtually impossible to keep up with the latest changes unless one's full-time attention is devoted to such work.

Many broadcasters are unaware of the additional spacing given to Class C stations that operate from less than Class C minimums. This additional 16 km (10 mile) buffer better allows the station to find a site for a new tower over 300 m in height. This buffer zone is slated to be discontinued in 1987 when these same stations will be declassified automatically to C1 or C2 status.

A benefit many broadcasters have ignored is the increasing of Class A antenna height maximums. The former maximum of 300 feet has been increased to 100 m, or 328 feet. Although 28 feet in itself is not a tremendous increase, when coupled with single-bay antennas and pattern studies to maximize the signal, it can have a profound impact on an existing Class A station. Stations presently operating at heights above an average terrain of over 100 m will have a more favorable power cutback. Any time a height above terrain or effective radiated power is changed, a Form 301 needs to be filed. Changes of this nature are classified as minor changes. Only changes in city of license or frequency changes constitute a major change.

For metropolitan Class C FMs needing to upgrade, the community antenna can be a viable option. Under this approach, several local stations agree to share the same antenna with a center of radiation greater than 300 m. This allows all stations sharing the common antenna to have basically the same coverage and avoid mandatory downgrades. Community antennas are particularly attractive in metropolitan areas where environmental, aeronautical, and space constraints put antenna locations at a premium. Their major drawback is financial. A much more expensive panel antenna is needed, along with expensive combiners and transmission line. But there may be a savings in maintenance and construction if these costs are pooled. In general, a minimum of four stations are required to make it economically feasible. For a Class A station with a 328-foot antenna, the cost would be difficult to justify.

Docket 80-90 is proving to be a very positive force. New service is being installed, AM-only stations are getting FM affiliates, and Class C broadcasters are maximizing their stations. The one drawback is that there may not be enough frequencies available to accommodate all the new FMs desired.

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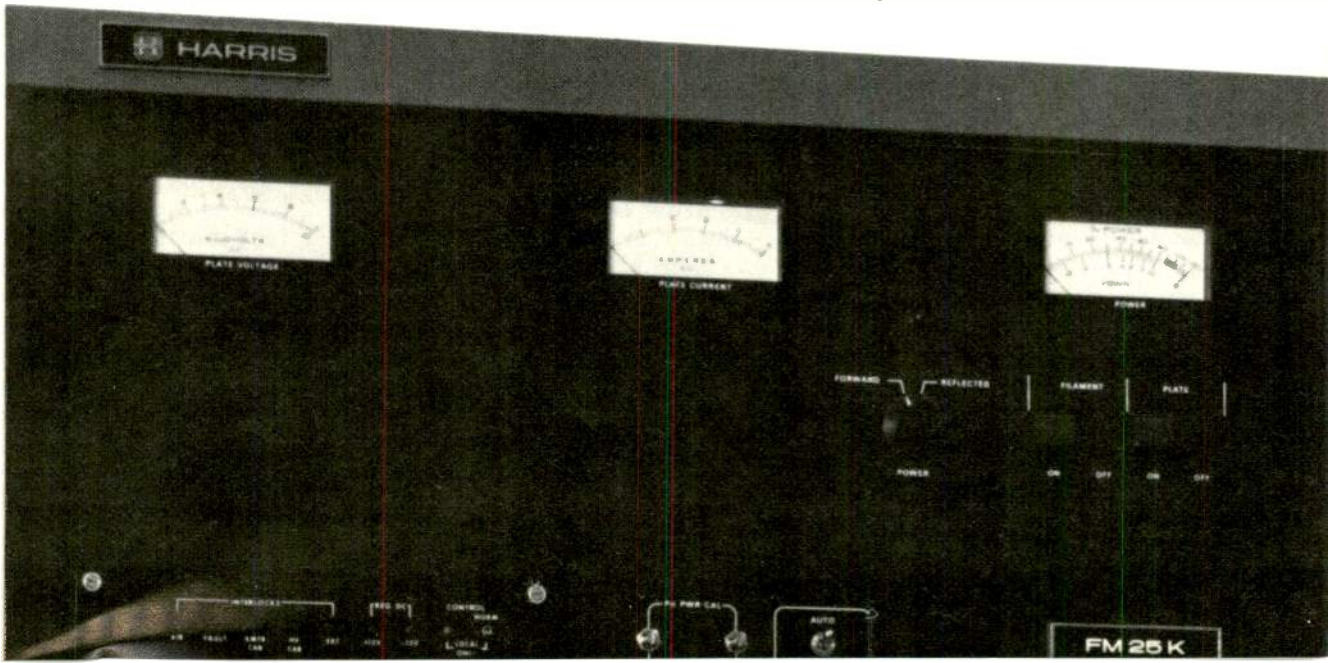

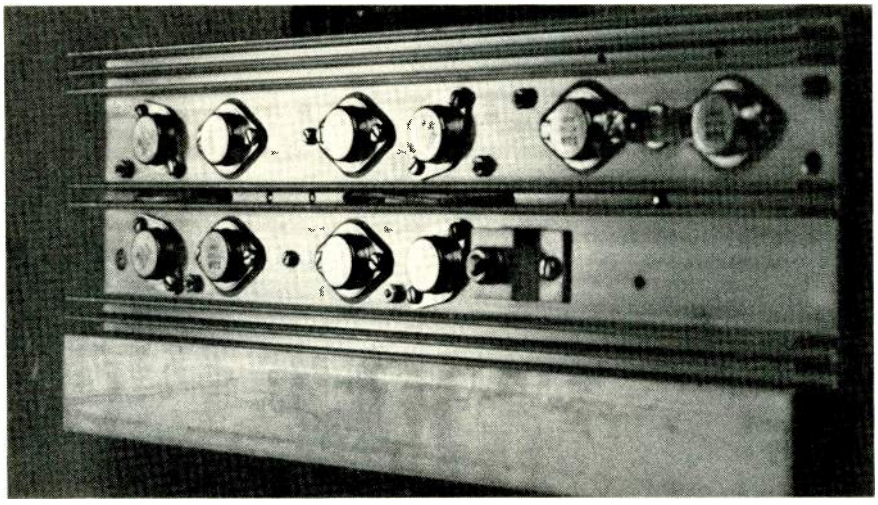

Metal Oxide Semi-Conductor Field Effect Transistors, or MOSFETS, have made solid-state AM transmission up to 50 kW possible.

state transmitters, even for higher power requirements.

The move to solid-state

"High power costs do cause some radio stations to buy new transmitters, if energy efficiency is a feature of the new transmitter," says Nautel's Jensen. He cited a cost savings estimate to one 50 kW AM of $40,000 per year if the station switched from tube to fully solid-state transmission.

Nautel is the first manufacturer to market a 50 kW solid- state AM transmitter in this country, and radio station KBMR, Bismarck, ND, was the first station to put one on the air.

Nautel had been building solid-state radio beacons since the late 1960s and was able to increase the mean time between failures, Jensen explains. At the time, bipolar transistors were used, and they could accommodate lower power needs. But for higher powers required in broadcasting, the transistors couldn't accommodate the higher frequencies required. In addition, Jensen says, bipolar devices are fragile, sensitive to static, inefficient in their power consumption, and expensive to build.

Then around 1979, with the rise of the semi-conductor industry, along came the metal oxide semiconductor field effect transistors, or MOSFETS.

"They are almost perfect switches," Jensen explains, "being totally on, or totally off, and can achieve switching efficiencies in excess of 90 percent in the power amplifier circuit. They are also capable of higher switching frequencies."

MOSFETS, which are also referred to as FETS (Field Effect Transistors), exhibit no apparent aging characteristics, Jensen adds, and are reliable, as long as they aren't stressed. Their main drawback is that they must be protected, and can't withstand surges in power.

Jensen says Nautel builds some protection right into its transmitter designs, by isolating the circuitry. Stations are also advised to add protection by providing lightning paths around the transmitter, and lightning arresters in the transmitter. Also, Jensen says, transmitters are built in modular form, so that should a portion suffer from a direct lightning strike, it would only damage part of the transmitter and the station could remain on the air, even if at lower power.

"Part of the reason we're so successful in high power is our method of combining transistors through a hybrid combiner," Jensen says. He explains that by combining them theoretically there are no limits on power, and there is also the soft-failure capability of the modular design.

Nautel manufactures fully solid-state AM transmitters in powers of 10-400 W, 1 kW, 2.5 kW, 5 kW, 10 kW, 25 kW and 50 kW.

FM solid-state

Nautel's Jensen and DeAngelo of Harris have pointed out the feasibility of manufacturing AM solid-state transmitters over FM transmitters. The disparity is due to the fact that MOSFETS used in AM transmitters are also in demand as switching power supplies, and the separate market insures an adequate supply at reasonable costs. But for the higher frequency transistors needed in FM transmitters, broadcasting is the main market, and producing them in quantity is not as cost-effective.

"For the FM band, the transistors are a specialty market, strictly for communications," DeAngelo says.

Harris makes solid-state transmitters for AM through 5 kW, and DeAngelo says the trend in AM is to convert to solid-state.

"Purchasing a transmitter below 5 kw that uses tubes is not state of the art for AM," he says. DeAngelo says Harris is looking at the possibility of building solid-state AM transmitters in higher powers but he adds that the criteria is that "we want it to be cost-effective to the broadcasters, too."

In FM, Harris has solid-state transmitters through 300 W, and DeAngelo says that currently in this country broadcasters "need tube technology for anything over 1 kW."

Paul Gregg, Elecom Bauer's president, does not agree that solid-state FM transmitters are not yet cost-effective. He says the feasibility of manufacturing both FM as well as AM solid-state transmitters has improved, and the company intends to make a strong showing in both areas this year. In AM, Gregg says MOSFETS have made the manufacture of solid-state transmitters feasible, and that Elecom Bauer will introduce 250 W through 1 kW models. In FM, he says, the company introduced 100 W power through 600 W power amplifiers this past year, and will have 1 kW

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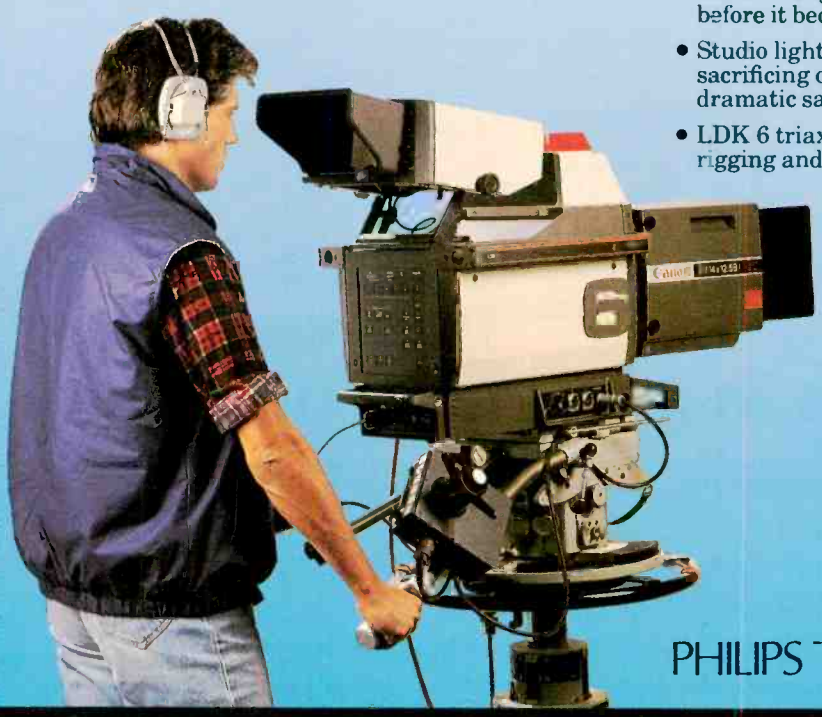

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up to 2.5 kW solid-state FMs this year.

Gregg agrees that the main reason FM solid-state transmitters have not been available is the lack of transistors that can handle the higher switching frequencies.

"The FM devices didn't have a market anywhere else, while the MOSFETS did," Gregg points out.

"The devices used in FM have been available in some industries, not yet in broadcasting, but they are available at a competitive price," Gregg says. "We feel power levels to 3 kW solid-state FM transmitters are competitive with their tube counterparts. The technology is here."

Most manufacturers don't share Gregg's optimism. They believe solid-state will hit the FM transmitter market, but not until the cost of the higher power transistors comes down.

Broadcast Electronics makes solid-state FM transmitters only at 500 W or below, and audio products manager Tim Bealor says anything above that level is not in the forseeable future.

"The higher power devices are not yet available," Bealor says. "You can get so much more power from a tube for a much lower cost."

Broadcast Electronics hasn't enetered the AM transmitter market, but Bealor says the new solid-state technology is causing them to take a look at it.

QEI makes tube transmitters for FM, but national sales manager John Tiedeck believes that the day of solid-state FMs is close. He says the company intends to introduce a prototype 2 kW solid-state FM transmitter that is intended as a driver for a 30 kW transmitter. The 2 kW will be all-solid-state, but the 30 kW will have a 30 kW tube.

Tiedeck says it still is not cost-effective to make solid-state FMs at higher powers.

Comark, a TV transmitter manufacturer, also sells Marconi AM and FM transmitters, and the AMs are solid-state to 1 kW, according to Jim DeStefano, director of systems marketing. He believes stations still can save money by staying with tube technology, primarily because solid-state transmitters are more expensive. He also says there are space considerations, with tubes generally taking up less space than paralleled solid-state transmitters. DeStefano agrees that solid-state transmitter life is longer, but says that tube life is longer than it used to be as well. He believes that station engineers are still inclined to go with tube technology.

"The penetration of solid-state is still rather low," DeStefano says. "Engineers are opting for tubes that are more rugged and

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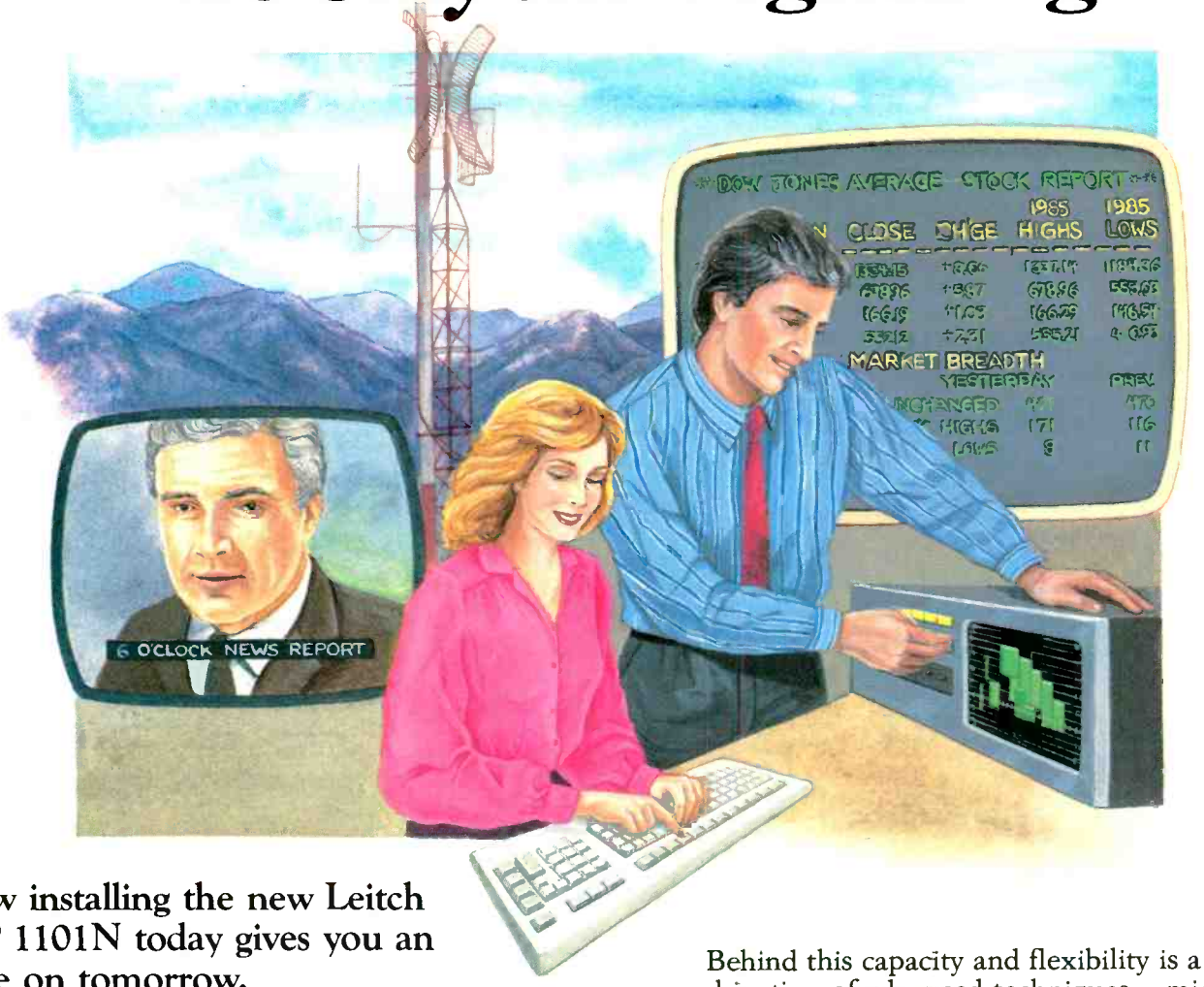

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less susceptible to lightning strikes than transistors. It's a tradeoff: if you protect your line from lightning strikes, you could have a solid-state transmitter that lasts a long time, but for the time being, it seems that most engineers feel tubes are the way to go."

Continental Electronics sells AM transmitters, and has not yet moved into the area of solid-state, but Collins believes the switch to solid-state is inevitable.

"It's going to happen; it's only a matter of timing. Our opinion is it is just now reaching the point where it is economically feasible to buy a solid-state transmitter," Collins says.

"There has to be something in transistorized transmitters to protect them, and we're just learning how to do that," Collins observes. He points to directional AMs, which have more complex antennas and therefore tend not to be as stable.

"In a case like that, when the impedence changes, tubes are far more forgiving," says Collins. But he believes these problems are beginning to be solved, and that "the day of the transistor is just about here."

One final factor that may impact on the acceptance of solid-state transmitters is their complexity. Charles Goodrich, who has designed transmitters over the years for McMartin Industries, says that while solid-state is being promoted for its lower maintenance costs, it may be difficult to find technicians who are as well-versed in transistor repair as in the simpler tube technology, at least for the time being.

"We found customers had difficulty maintaining and repairing solid-state transmitters they had purchased," Goodrich says. "A tube can take a great deal of abuse and heat. But even slight mishandling can damage a transistor." Goodrich believes parts availability may be a problem in solid-state maintenance, especially with a recent downturn in the semi-conductor industry. He contrasts the situation with the widespread availability of tubes, which he points out can also be rebuilt at relatively low costs. Still, he acknowledges the interest in solid-state technology, and says the situation could change as acceptance comes about. McMartin, which has manufactured AM tube transmitters, is currently in a "wait-and-see" position, facing Chapter 11 difficulties.

While predictions as to the acceptance of solid-state transmission in radio are split, it seems likely that more stations will move in that direction, at least on the AM side, and that along with regulatory considerations such as 80-90 and the question of AM stereo, the pros and cons of solid-state will become an important consideration prior to transmitter upgrades. **BM/E**

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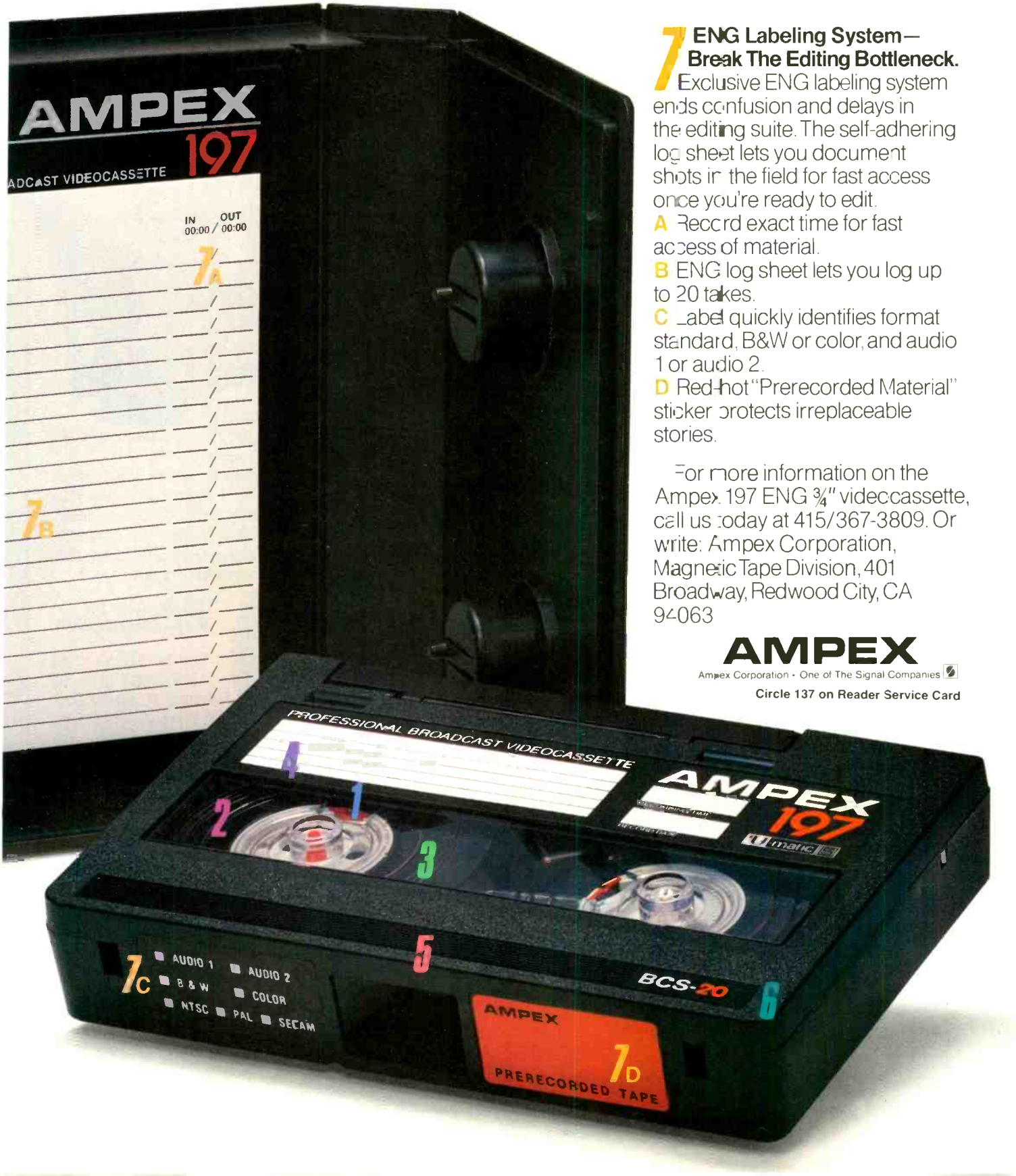

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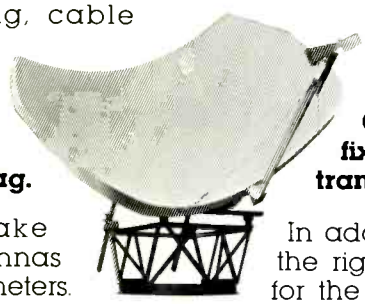

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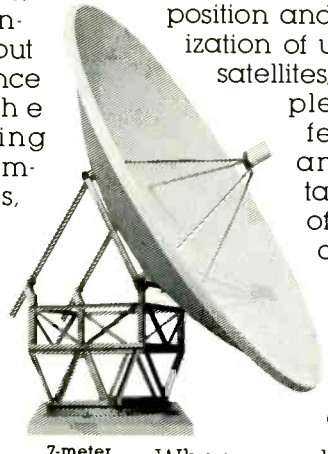

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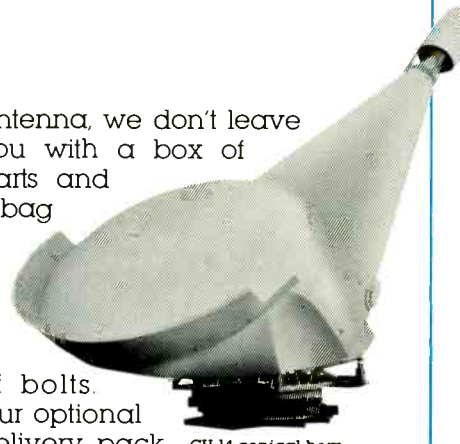

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Klystrode Transmission Comes to UHF TV

By Hugh Aldersey-Williams

The Klystrode—a novel transmitting tube for UHF developed by Varian EIMAC more than five years ago—is now being incorporated into a high-power transmitter from Comark that is capable of both audio and video signal transmission. The design is expected to debut at this year's NAB. Following successful tests last month, the Klystrode now stands poised to replace the klystron in UHF TV transmission, according to Jim DeStefano, director of systems marketing at Comark.

So far, Comark and Varian EIMAC's exclusive partnership marks the only commercial activity in Klystrode development. George M. Badger, marketing manager at Varian EIMAC, says many other companies have shown interest in the Klystrode, but have a "wait and see" attitude toward its adoption.

The Klystrode helps meet the requirement in UHF TV transmission to minimize power losses, both because of high energy costs and because of the need to match the efficiency of competing VHF.

The Klystrode is a combination of a klystron and a tetrode with the advantages of both, says Varian EIMAC. It retains the output cavity and collector configuration of a klystron, but replaces its power-hungry velocity-modulated electron beam with a grid-controlled density-modulated beam. The grid-cathode structure resembles that of a tetrode. Figure 1 compares the performance of the Varian EIMAC Klystrode with a conventional UHF tetrode.

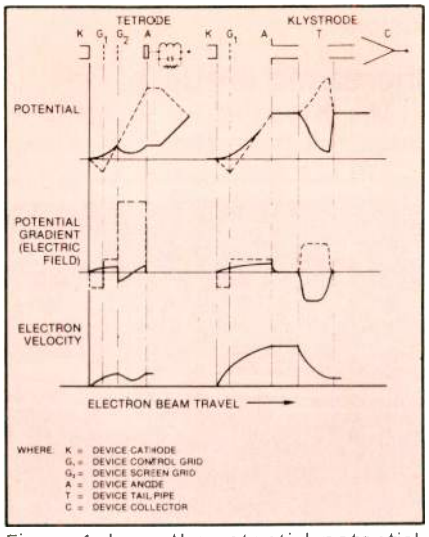

Figure 1 shows the potential, potential gradient and electron velocity vs. beam distance, for a tetrode and a Klystrode. In the top two drawings, the solid line indicates the tube characteristics at minimum conduction and the broken line shows the tube at maximum conduction.

In a tetrode, the high density of the electron beam puts the grid under considerable stress during operation. In extreme cases this can lead to failure of the device. The Klystrode has a much lower beam density, says Comark's president, Nat Orstroff. Another source of tetrode failure is cathode expansion causing it to come into contact with the grid. The Klystrode avoids this by using a larger cathode that operates at a lower temperature.

Klystrode layout

Figure 2 shows the layout of the Klystrode. It operates as follows: first, an alternating RF voltage is set up between the cathode and the grid. This causes the electron beam from the cathode to become bunched or density-modulated as it accelerates toward the positively charged regions of the Klystrode. The beam passes through an apertured anode without striking it and continues through a field-free region at a constant velocity. It next passes an output gap in the resonant cavity when the electric field induced by the passage of the beam is decelerating. Finally, the beam passes through a second field-free constant velocity region before leaving the Klystrode's tailpipe and striking the collector. The magnetic field in the Klystrode maintains the electron beam's focus, especially in the output gap where the velocity falls and space-charge forces are high. Magnetic focusing allows the size of the tailpipe to be kept compact. This in turn

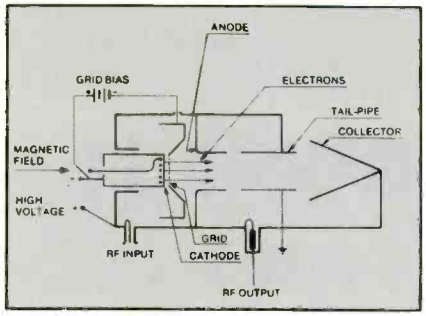

Figure 2 shows the structure of the Klystrode, which combines the features of a klystron and a tetrode.

decreases the output gap capacitance and maximizes the obtainable bandwidth.

The Klystrode thus achieves a highly efficient Class B type of operation in which the beam current varies automatically in accordance with the required output power. "Therefore," says Orstroff, "the average input power line energy required is significantly lower than any device or system currently available for use in high-power UHF transmitters." Badger likens the promise of the Klystrode to that of the Class B modulator when it was introduced into AM broadcasting 50 years ago. The Klystrode will consume little more than half the power of a klystron, he says. Orstroff's tests currently give the Klystrode transmitter design a 100 percent figure of merit (calculated as peak power output divided by average dc input). Ultimately, a 60 kW peak output could be achieved for color picture transmission from an average dc input of just 55 kW, he says (a 107 percent figure). Power savings are translated into equivalent cost savings. "A 60 kW Klystrode might be paid for in two years by power savings," Orstroff claims.

Increased lifetime

The Klystrode is expected to largely displace klystrons in both visual and audio signal amplification in new transmitters. In addition, says Orstroff, "there appears to be no fundamental reason why Klystrodes cannot be retrofitted into existing UHF transmitters." Beam voltages are similar for both tubes. A slightly higher drive power is needed for the Klystrode grid, which is the only major difference.

Klystrode transmitters are expected to be commercially available at 30 and 60 kW power levels by the spring of 1987, says Comark's DeStefano. Comark does not anticipate much competition at least at first from other possible buyers of the Varian EIMAC tube after spring this year when the two companies' exclusive contract expires. Comark will have to make the running before others will follow. Nonetheless, says Orstroff, the Klystrode could "go a long way to reducing the economic penalty currently being paid by the UHF industry." **BM/E**

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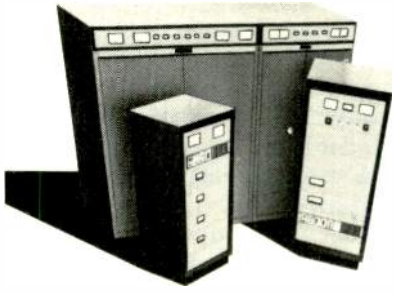

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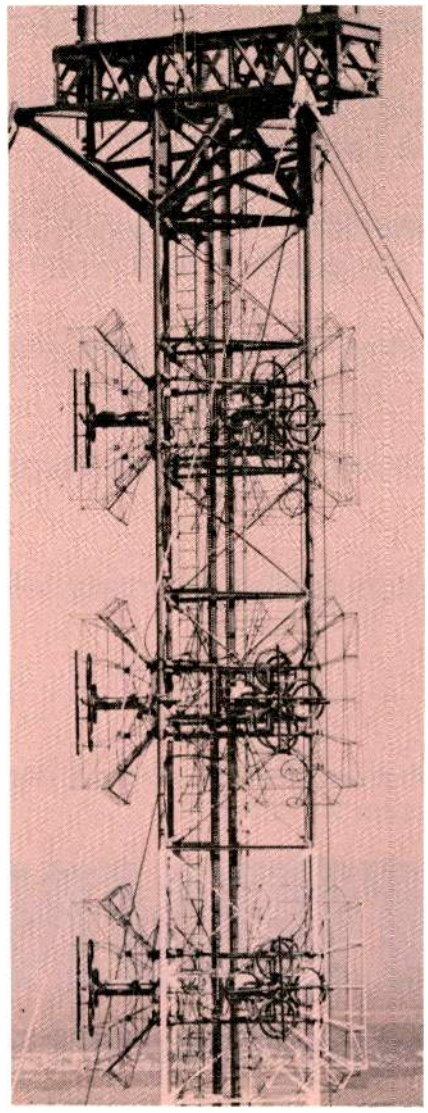
TV Transmission After RCA

By Hugh Aldersey-Williams

RCA's shock decision to shut down its broadcast division last October left a vacuum in the TV transmitter and antenna marketplace. The company's move is clearly bad news for existing owners of RCA equipment. But it is good news for those still competing in the UHF and VHF transmitter markets. Who stands to gain the most?

All the principal players—Harris, NEC, Philips, Acrodyne, Larcan, Comark, and Townsend—are optimistic. "It's a real horse race," says Nat Orstroff, president of Comark. Industry sources currently give RCA 60 percent of the installed base of VHF transmitters and 43 percent of the UHF transmitter base. In both frequency ranges, Harris Corporation holds second place with about half these figures—30 and 19 percent respectively.

This does not present the whole picture, however. In recent years, RCA's sales had slipped to the point where its broadcast operation lost $15 million in 1984 and more than $70 million the year before. The transmitter and antenna side of the division's operation was not hardest hit. In the end, says Andrew M. Hilliard, the division's manager of advertising and promotion, RCA commanded a 30 percent share of transmitter sales (VHF and UHF) and 70 percent of the antenna market.

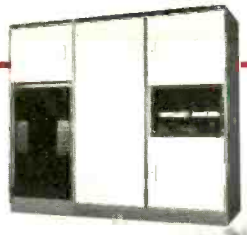


For owners of RCA equipment, the company plans to maintain its TechAlert troubleshooting team of engineers until the end of 1986. As the Broadcast Systems Division is phased out of existence, its other service, repair, and sales operations will be transferred to other divisions. RCA's technical training for broadcast customers will conclude in March, with service only available on a custom basis at client sites thereafter.

Making gains

In UHF, Harris took up most of the slack, claiming more than two thirds of current sales. As the new market leader, Harris would appear to be well positioned to capitalize on RCA's departure. The company is cautious about its prospects, however. "I can't predict that," says Kenneth R. Schwenk, vice president and general manager of Harris Broadcast Group's studio division, when asked if Harris stands to gain all of RCA's share. "But we are a viable company offering service and product," he notes.

Other companies are also bullish about new market prospects. Bob Blair, transmitter systems manager at Philips Television Systems, points out that many



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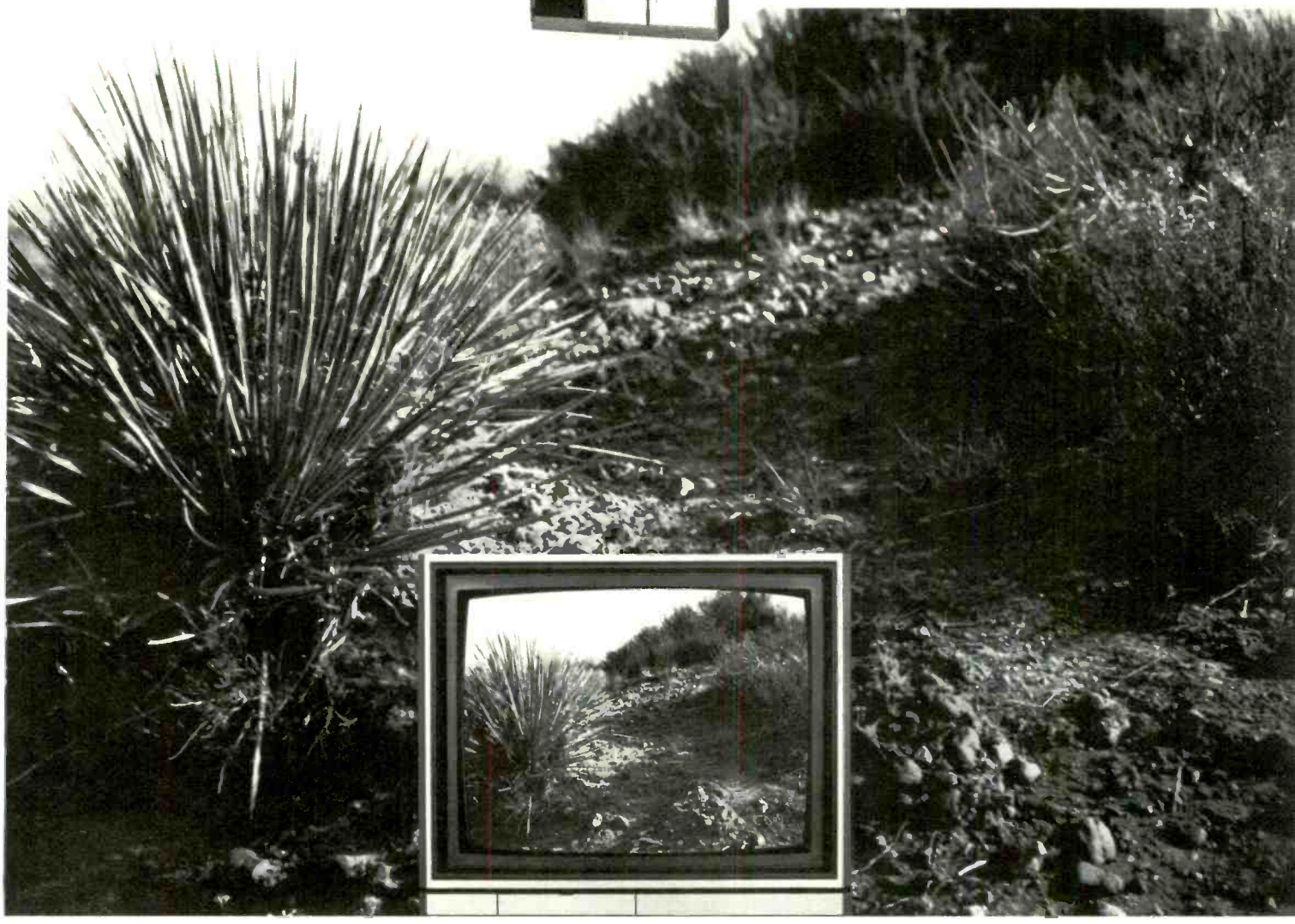

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RCA transmitters are aging and will shortly need to be replaced. Since RCA is not there as the preferred vendor, there is that new opportunity. Blair is chary of making specific predictions because the future for the UHF startups is difficult to fathom.

Lew Page, U.S. sales manager for Larcan, suggests the industry now favors smaller, more specialized vendors. One factor contributing to RCA's problems was that it tried to supply everything from cameras to antennas with no obligation from customers to buy a complete RCA range of equipment.

NEC's RF sales manager, Joe Engle, claims his company's competitive pricing gives it the edge. NEC's business should increase "dramatically" in the transmitter area with RCA out of contention, he says. NEC had been one of the companies that was already gaining substantially as RCA lost market share in the last few years.

Acrodyne, too, is looking to profit. Tom Creighton, vice president of marketing there, says the company is contemplating entering the low-band, high-power VHF arena.

Choices of technology are providing new trends in the market as well. As in AM radio transmission, there are the questions of whether to opt increasingly for

Transmitters: How to Choose?

The trend in transmitters is towards ultimate transparency—the output must accurately represent the input. Beyond this basic requirement is the urge to increase fidelity, by raising both input and output bandwidths. In AM radio particularly, there is the concept of extended audio; in TV the future will bring MTS and, ultimately, enhanced definition. *BM/E* asked the chief engineers of a number of stations and station groups what their criteria were for selecting a new transmitter. Here is their response:

AM Radio

- *Reliability*. Track record of transmitter manufacturer.
- *Technology*. Wideband performance. There should be no distortion on highly processed waveforms. Look for tilt, bounce, and phase shift.
- *Stereo*. Stereo sound quality is currently limited by transmitter technology, not by the exciter or stereo generator. Look for lost modulation capacity of the mono signal—bounce, tilt, and ringing as a result of adding stereo—has the L+R signal been degraded?

FM Radio

- *Technology*. In FM transmission, there are regular improvements in exciter technology. Look in manufacturer specifications for a wideband exciter with the ability to handle all the sidebands. Check linearity and distortion sonically, with both objective and subjective tests on a processed signal. If possible, split the processor output into different transmitters. This will confirm that it is not the processor that is accidentally being tested.
- *Performance*. Will the transmitter make at least its rated power? Turn it up to run at 110 percent of its rated maximum. There should be at least this margin to ensure that the transmitter will operate satisfactorily under adverse conditions.
- *Maintenance*. Simplicity and ease of servicing are key issues with today's shortage of good RF engineers. Is there round-the-clock factory support? Call up at 3 a.m. one morning to find out the truth for yourself.

VHF TV

- *Reliability*. Track record of transmitter manufacturer.
- *Price*. Current exchange rates may give companies from abroad an edge in the market at the moment.
- *Technology*. There is not much to choose from between different manufacturers in terms of tubes used. Go for simplicity and avoid multiple solid-state devices.

UHF TV

- *Reliability*. Track record of transmitter manufacturer.
- *Performance*. Unlike VHF, transmission efficiency is a key factor here. Measure klystron efficiencies under load. Do not rely on manufacturer figures for individual klystrons. You need an overall plant efficiency figure.
- *Price*. All manufacturers are negotiable when it comes to discounts.

Other issues to consider include the space that a new transmitter will occupy. Will it fit, or will it require site expansion? Will the old transmitter be dismantled, or used as a standby? Also, consider the space available in the existing cabinet for a new klystron tube. How well the cabinet adapts to newer technology can limit the changes made to the transmitter. Protection devices should be assessed: is there one protection device for the complete unit or are the individual ones for separate cabinets?

solid-state equipment.

Transmitter manufacturers agree that in stereo it is programming and studio equipping that are determining the rate of progress. New transmitters are, on the whole, being made stereo-compatible. "The majority of stations going on the air will be equipped to handle at least stereo," says Philips' Blair. Most new independent UHF stations cannot yet afford stereo programs, observes Bob Anderman, vice president of marketing at Townsend Associates. Unless they are specifically a music video station, their needs are modest, relying on old movies and satellite programs. Nonetheless, transmitter manufacturers are selling them stereo-compatible devices to meet the stations' future needs.

In other areas of technology, advances in klystron design keep the solid-state question hotly debated. Most notable among recent moves is Comark's deal to incorporate Varian EIMAC's Klystrode tube into its transmitter (see "Klystrode Transmission Comes to UHF TV," p. 61). Other companies, however, remain skeptical. "We see no real value in that device at this time," says Townsend's Anderman. Townsend instead favors an air-cooled klystron made by Valvo, currently in operation in some European installations. Townsend is working with Valvo to improve the design and bring it to the U.S. The company aims to replace the tetrode tubes in its 5 and 10 kW transmitters with the air-cooled klystrons. Klystron lifetime will greatly exceed that of a tetrode, Anderman says.

Philips also uses a vapor-cooled klystron. The design does away with the need for pumps, and lowers the power requirement to increase efficiency. According to Blair, the tubes are external cavity devices with either an annular beam control or a special control electrode cutting the power requirement by 25 percent compared to an integral cavity klystron.

The movement toward transistors remains undeniable, however. Against this, George M. Badger, marketing manager at tube manufacturer Varian EIMAC, offers some words of caution. "One of the major reasons for the popularity of solid-state," he says, "is that it is naturally assumed to be more reliable and more efficient. However, when you get up into transmission equipment where the power level is tens and hundreds of watts, it is no longer true." Some proponents of solid-state transmitter design take their reliability figures from low-power computer equipment and assume they apply at higher power levels, he claims.

While predicting a short-term resistance to solid-state design, Badger recognizes the long-term trend. "At the same time," he concedes, "I have no doubt that 20 years from now the transistor will be more reliable." **BM/E**

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New TV Signal Architectures: NTSC's Relatives Move In

S-MAC, B-MAC, D_2 MAC, RGB, M-II, Beta, enhanced NTSC together at SMPTE—but a potentially fractious family

By James A. Lippke and David Hawthorne

Television engineers are faced with hard choices these days, as NTSC has been declared obsolete because it just isn't good enough anymore. The viewers of tomorrow are certainly not likely to tolerate anything produced to the NTSC standard when better pictures are available elsewhere, as the current school of thought goes. What must one do? Adopt the much talked about analog component approach? But which one: Y, I/Q or Y, R-Y, B-Y or S-MAC? What bandwidth is the acceptable minimum? Should one wait for the all-digital plant to arrive? How about "enhanced" NTSC? Is it an alternative? Is HDTV for real?

If you attended the One Hundred and Twenty Seventh SMPTE Technical Conference in Los Angeles last October, you would have observed some of the benefits in store for you for the following:

- An analog component approach using a Y, P_B P_R component set—the so-called SMPTE S-MAC plan.
- A digital component approach actually used by SFP, France, to produce an all-digital music video.
- An HDTV demonstration using 1125 lines—the NHK approach.
- An enhanced NTSC approach rivaling RGB performance—a scheme using two comb filters in encoders developed by Faroudja Laboratories.

The exhibit floor offered several opportunities to see analog component equipment tied together in systems. Shintron, for example, offered from-source-to-output equipment including a production switcher, an RGB digital framestore/DVE unit, a component downstream keyer, component routing switchers, and an intermatrix (RGB, YIQ, Y, R-Y, B-Y and Beta) signal format converter.

A full afternoon at SMPTE was devoted to HDTV. Appropriate Gamma and dynamic range needs were discussed and interlace versus progressive scan debated. Often the intended use of the program material is a critical factor. As was brought out in the HDTV panel discussion, progressive scan may be better for theatrical presentations, but interlace is better for sports programs that want to show slow motion.

There are yet more options and more decisions. What is the best way of transmitting an enhanced NTSC, S-MAC or HDTV signal? Ron Katznelson of M/A Com Linkabit argues that theoretically, BNTSC is better than MAC, for transmission purposes. And what in the world is BNTSC? Katznelson described it as a composite format identical to NTSC, except that the horizontal blanking interval is replaced with digital audio symbols, thus avoiding the need for audio subcarriers. But another SMPTE paper by Keith Lucas of Scientific-Atlanta built the case for B-MAC as an invention specifically designed to improve channel efficiency in FM satellite TV transmissions. Lucas argued that B-MAC was the best route to transmit HDTV. But there was no one giving a paper defending D_2 MAC, the "standard" adopted by Europeans as a means of delivering "enhanced" pictures to European audiences by satellite *and* cable TV. D_2 MAC is described as a compromise compatible with today's satellite and cable TV technology.

As stated by a SMPTE paper authored by Don Reynolds and Lyle Keys of Utah Scientific, "hardware to accommodate coexisting PAL/NTSC, MAC and HDTV standards presents unique problems." Some of the techniques used by Utah Scientific in its new routing switcher and video DAs as

they relate to return loss, line equalization, cable lengths, and high bandwidth designs were described. The program was, however, missing any overview discussion of control interfaces that must evolve to truly integrate new equipment into systems.

Indeed, the choices and decisions to be made are legion, and it is difficult to get a handle on the subject. The theme of October's SMPTE conference was "New Directions in Technology: Difficult Decisions." What one could see and hear at Los Angeles certainly reinforced the theme. A variety of diverse ideas are before the industry in this post-NTSC/PAL/SECAM era. "Plurality" describes the milieu; while there are brave efforts afoot to develop standards—international standards—little unity of thought is apparent. There were no "seers" at SMPTE that tried to put it all together.

One might have hoped to see hardware and proposed plant designs that would accommodate analog component processing as an integral part of the existing NTSC plant. Indeed, some more or less complete setups for analog processing were on display and routing switcher manufacturers were talking bravely of routing three separate signals—and saying that this is no great problem. But there were no signal architectural drawings on hand that readily facilitated the movement of the signal in a variety of forms.

Although the logical starting point is three separate input signals—R, G, and B (the output of cameras)—the end-of-the-plant output must be something else—NTSC, PAL, SECAM, BNTSC, B-MAC, D_2 MAC, 1125-line HDTV, $N^{\times}$ HDTV or maybe Showscan. The output must satisfy the requirements of the delivery system now in place and in the future, be it terrestrial or satellite broadcast, cable-, fiberoptic-, VCR-, videodisc-distributed, or a theatrical release. There must be some kind of compatible receiver/display system of an electronic or optical nature in place. The many delivery systems are part of the problem. A multitude of delivery systems must be accommodated simply because the high cost of quality entertainment programming requires multiple markets. TV alone, cable alone, or theatrical release alone will not pay for today's high production costs.

The case for S-MAC

The momentum for the S-MAC analog component approach continues because of its inherent compatibility with the already-adopted digital component standard CCIR 601. Equipment for the proposed S-MAC standard is already being produced and sold. S-MAC eliminates the artifacts found in NTSC systems due to interference between color and difference signals. S-MAC, which gets rid of dot crawl, color moiré and the like, was described by S. Merrill Weiss, chairman of the SMPTE Working Group on Component Analog Video standards and a member of the Working Group on Digital Standards, on page 77 of *BM/E's* November, 1985 issue.

Weiss carried the message further at the SMPTE conference as coauthor of a paper with Stan Baron of NBC entitled "Components at the Crossroads: Making the Right Choices." The "choices" can be represented by a matrix of possibilities:

Analog Composite	Digital Composite
Analog Component	Digital Component
Parallel Analog	Parallel Digital
Serial Analog	Serial Digital

Digital composite, said Weiss and Baron, is simply analog composite digitized. The same process applies to component signals. You start with R, G, and B analogs, convert them to luminance and color difference signals, still in analog, then digitize them. Or you can digitize R, G, and B directly and later derive luminance and color differences.

Either analog or digital component versions can be carried on parallel cables or conductors, or they can be multiplexed to pass through a single channel, as represented by the following matrix:

Because the pictures are represented in the same components in all quadrants of the matrix, conversion between the several versions is relatively easy, say Weiss and Baron. The beauty of this situation is that producers can use whichever forms are most appropriate to the particular application. They can be converted to other forms for other applications if that is most desirable. This, argued Weiss and Baron, "yields the maximum possible flexibility in plant design."

If distribution technology improves—even analog composite—it does not make obsolete productions created in the component format. And, it will never be as broadband as what is possible in the creation and recording of images.

With interrelated forms of component signals all standardized, the choice of composite or component, either analog or digital, and the choice of parallel or serial are questions that can be answered by the economics of the application and the equipment to be interconnected.

But such standards are not yet quite here. The draft for a standard for a single-channel (serial) multiplexed analog component video interface has been prepared (September, 1985, DOC T 14.22-X2E.0) as well as a draft for a three-channel parallel video interface (same date, DOC T 14.22-X3G.0). Final approval should be in just a matter of months. Both provide compatibility to the other, to the CCIR recommendation 601 for digital component signals, and to the SMPTE-recommended practice RP-125 for parallel digital component signals. This is not to say that everything is pinned down. At Los Angeles, the Working Groups were soliciting opinions on such matters as the preferred connector arrangement.

Does this mean that equipment

built to these standards will be readily available, or that it will meet the standards proposed by the Subcommittee for Digital Control? If such equipment is not "readily available," then when will it be? Should one wait for such totally compatible equipment (signal processing and control), or will equipment purchased now be retrofittable to the new standards? These are some of the questions that should be asked before rushing into new architectures.

The case for optimized NTSC

Just as soon as it appeared that compatible analog/digital component processing was the way to go, an alternative was proposed.

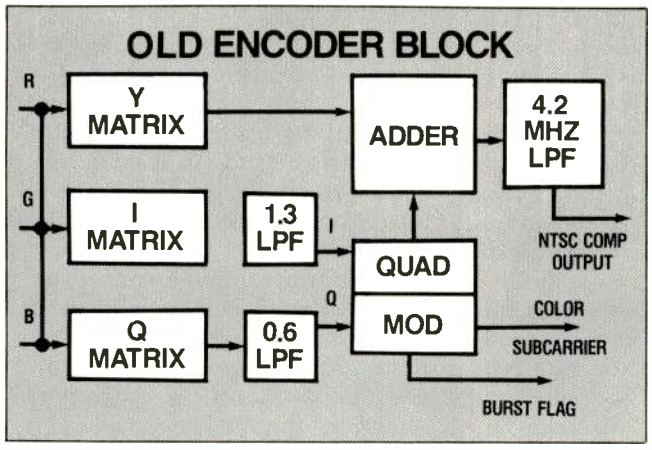
Taking advantage of semiconductor technological advances, Faroudja Laboratories announced new encoding and decoding equipment that "optimizes NTSC to RGB performance." Such was the title of a paper given at the SMPTE show by Yves Faroudja, who had an equipment demonstration that backed up his paper. Faroudja's approach, he says, "virtually eliminates the effects of cross color and other undesirable artifacts." While near RGB quality, it is totally compatible with existing NTSC equipment, thus rendering better NTSC images to current viewers. Furthermore, when combined with other current technologies in the pipeline, enhanced NTSC will be possible which, Faroudja boasts, will ultimately rival presently proposed HDTV systems without imposing the higher line rate and wider spectrum bandwidth requirement. Sound too good to be true? Almost, but the equipment to do the job is now possible, says Faroudja, and it is ready to be sold.

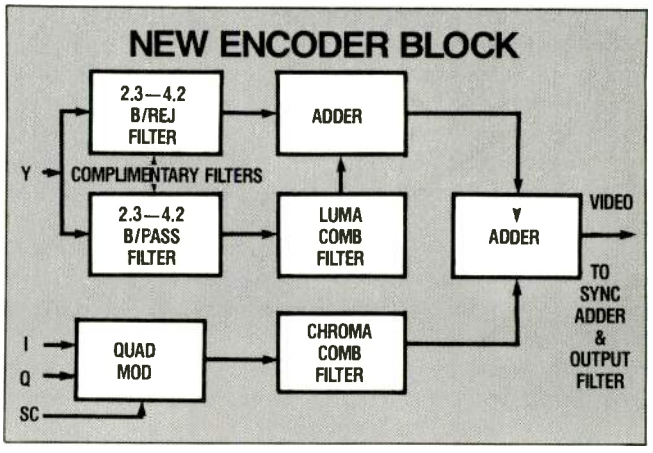
The problem with NTSC encoders has been filter limits, as Faroudja explains. Spectrum analyzers show frequency interleaving around the subcarrier frequency. Luminance information is grouped around multiples of the horizontal line frequency (15,734.26 Hz) while the chroma components are grouped around the color subcarrier sidebands: (2n = 1) fh/2. The incrementally displaced bundles of luminance and chrominance energy are an accurate representation of the spectral nature of vertical components in the picture. This being so, good separation of luminance and chrominance can be made by comb filtering in the receiver. However, while this may improve vertical transitions, diagonal and horizontal transitions will show a very clear overlapping of chroma and luminance spectra. Separation of such Y and C components in the receiver is very difficult. This shows up as cross color (i.e. color when none is there) and the inverse color affecting luminance. Faroudja reports that one or two lines of dots at 3.58 MHz will be present in the luminance path for a horizontal chroma transition going through a comb filter decoder. Inexpensive notch filters in the luminance path either provide a poor frequency response or a vertical dot pattern with vertical chroma transitions or both. In other words, it is difficult to decode normally encoded NTSC signals because of inherent cross contamination of luminance and chrominance during encoding.

While complex comb filters may reduce the effects, the simpler approach is to prevent risk of contamination in the first place—at the source. This can be done by allocating different spectral areas to Y and C components in the encoder. By reducing or preventing Y/C spectral overlap in the encoder, better separation can be obtained in the decoder. The trick is to achieve spectral separation by using *two* comb filters in the luminance path and the chroma path prior to addition (see diagram). The elimination of cross color and cross luminance is detectable with all types of decoders including simple notch types. Complex decoders do an even better job. Furthermore, chroma noise is reduced, because no luminance noise gets into the chroma path.

The use of a simple two-line filter is currently the way to go. Costs are low and filters are easy to implement. In the future, costs of more complex bidimensional comb filters may come down, making it possible to use both frame and line comb filter techniques.

Two-line filters in encoders improves results without any change in receiver decoders. For critical applications requiring high resolution and no visible artifacts—such as large-screen projection, precision color monitoring, tape-





to-film transfer, color keying and standards conversion—Faroudja has developed a special decoder. It uses a novel active comb filtering method that suppresses dot crawl. The luminance bandwidth extends to 7 MHz, and the S/N ratio is improved.

Faroudja says that his approach is compatible with other proposed NTSC improvements reported by Kerns Powers, RCA Laboratories, and others.

The case for digital video

Taking the lead in putting an all-digital studio in place, built to CCIR 601 standards, has been France. Joining in the effort have been French TV's Public Service Companies under the leadership of TDF (Telediffusion de France), the French Ministry of Industry, and Thomson-CSF. The production company SFP used the all-digital plant, now located in Rennes, to produce the world's first all-digital music video. The techniques used included multiple generations of video effects and various graphics, all overlayed and assembled on digital VTRs. The final product was all illusion—cars travelling down a highway through the center of a city, beach scences, nightclub scenes, etc.—since there was no on-location shooting at all. Scene shifts between daylight and nighttime were synthesized.

At the SMPTE show, Michel Oudin, director-general of SFP, showed this video and explained how it was put together.

Key equipment included a digital switcher, a digital slide scanner, a color corrector, keyer, character generator, and special effects unit all built by Thomson-CSF. Bosch Fernseh supplied three digital VTRs, modifying the transport of Type-B BCN recorders. A modified CMX system was used for editing. Since the VTRs use only parallel inputs and outputs, it was necessary to put a deserializer at both the input and output. Color correctors become an important tool, and three were used by SFP; two with VTRs, and one for the switcher (either input or output). SFP found an independent chromakeyer valuable in addition to the three internal chromakeyers in the switcher.

Such image processing ability—keyers, color correctors, digital memories—combined with multilayering techniques without any loss or degradation even after repeated recording, opens up a whole new range of possibilities, according to Oudin. The Thomson-CSF switcher (TTV5640) offered four levels of image composition—two foregrounds and two backgrounds.

The French all-digital plant provides some insight as to what is necessary regarding signal processing through the plant. The routing switcher used 16 inputs (expandable to 32). It switches digital serial signals at 243 mBits/s (encoded on nine bits). The bit rate is derived by multiplying 27 MHz (13.5 MHz in a 4:2:2 format) by nine. Each output of the switcher goes through a deserializer.

The case for HDTV

Despite the claims that optimized or enhanced NTSC might rival HDTV in picture quality, HDTV still stands alone in that it results in a wider picture more typical of most motion picture screens. Compared to existing NTSC, an 1125-line system will sharpen the picture five fold, and offer a big improvement in color rendition. A strong case can certainly be made for HDTV, and, as some observers at SMPTE pointed out, it will go forward even if it is shunned by the broadcasting industry and the motion picture industry (for lack of bandwidth in the case of broadcasters; film improvements in the case of motion picture producers). Medical applications alone are likely to be a sufficient driving force, say some observers.

Difficult choices

Eastman Kodak, in its ongoing development of the film medium, has oft stated that the quality of film to which HDTV aspires is a "moving target": No sooner does the electronic world seek to match a quality level established by a set of parameters based on current film technology, than the film industry extends those parameters, weakening the claim that HDTV matches film quality. The prospects for all-digital television suffer from a similar challenge, namely that the rush of enhancements to analog systems keeps embracing new quality—economic and operational improvements that reduce the apparent urgency to move to an all-digital system.

By this spring, major developments are likely from Matsushita on the development of its M-II format recording system, another Y, R-Y, B-Y analog component recording system that the company discussed for the first time at NAB '85. The new M-II format promises quality equal to or better than existing one-inch Type-C performance on half-inch videotape.

What, then, is the broadcaster or professional user to do? There are a number of ways of looking at the problem. One: As enhancements to analog systems continue to roll out of the laboratories, it seems reasonable to assume that a general movement to all-digital will be delayed. Certainly, some special all-digital environments are likely to evolve, but for most routine applications, it seems that improvements in analog will be both cheaper and easier to implement.

Moreover, if genuine savings can be produced by the new analog or enhanced NTSC systems, the pressure to control production costs will intensify the desire for an alternative to NTSC, PAL, and SECAM.

The key, however, to major advances in the adoption of one or more of the proposed options is two-fold: One, interformat compatibility—no one wants a system that assumes only one kind of finished product—you have to meet the quality requirements of a host of distribution systems. Two, the parallel development of a unified approach to machine and systems control. Whatever savings these systems may offer will be miniscule compared to what cost will be added if plants cannot be fully integrated. **BM/E**

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SMPTE Seeks "New Directions" at Quiet Show

Staff Report

Last fall's 127th convention of the Society of Motion Picture and Television Engineers, October 27 through November 1 in Los Angeles, reflected its theme of "New Directions in Technology—Difficult Decisions" more in the sessions and at the technology demonstrations than on the exhibit floor. Not only were there fewer product introductions than at the previous year's convention, in New York, but traffic on the floor was light during the show's entire four days—despite SMPTE's claim of the highest registration (15,618) in its history.

In part, the light traffic was due to attendance at the papers and seminars, where presenters debated the outcome of several important recent advances in television technology, including analog component video, enhanced NTSC, and MTS, among many other topics. SMPTE's standards-setting work—now at a critical stage in the HDTV proceeding especially—also generated interest. At the opening session, SMPTE engineering VP Richard Streeter stressed the importance of cooperation by manufacturers and users in setting standards for new technologies before the creation of incompatible de facto standards.

On the floor, however, aside from a handful of very significant new products, manufacturers seemed largely to be reverting to their established practice of reserving product introductions for NAB.

The exceptions came in several areas: signal processing (Ampex's Zeus TBC), component digital effects (Grass Valley's component Kaleidoscope, Abekas' Zeno, and DSC's Illusion), text generation (Chyron's Scribe and the Aston 4), and test equipment (innovative audio and video products from Tektronix, Magni Systems, and others). In post-production, CMX replaced its industry-standard system of many years, the 340X, with the new 3100, and Steadi-Film Corp. announced a solution

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for telecine film weave. In audio, Lexicon unveiled a prototype for a disk-based audio editor with great potential, and Orban came to the rescue of MTS TV stations with a new stereo synthesizer. With highlights like these, it seems almost unfair to complain that the show as a whole was slow.

Following are reports on the major technological areas addressed by manufacturers at SMPTE.

SMPTE Flips Over Component Effects

Much of the special effects dazzle of the Los Angeles SMPTE centered on the Grass Valley Group booth, where the brand-new Kaleidoscope digital component video effects system took its first bow. Grass Valley was careful to point out that the Kaleidoscope press and attendees saw was an "engineering model," and promised that glitches would be ironed out by Kaleidoscope's scheduled NAB introduction.

Kaleidoscope is designed for use in a live environment and features a range of preset effects. Its interface is designed to make the effects seem like an extension of the switcher. Kaleidoscope can be configured as a standalone unit or as an enhancement to the Model 300 switcher.

The importance of component video to today's engineers was further illustrated by Ampex's announcement of a component I/O kit for the ADO. With the new add-on, standard composite ADOs can have component input and output capabilities, bringing the full range of the ADO's digital effects into the component studio. The two-board modification should be available early this year.

Another component digital effects system, the $29,900 Zeno, was introduced by Abekas. It adheres to the international 13.5 MHz, 4:2:2 digital sampling standard, and accepts RGB or Y, R-Y, B-Y inputs. Both preprogrammed and custom effects are available.

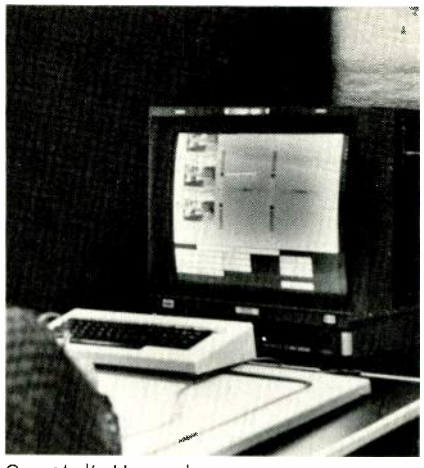
GVG Kaleidoscope installed in 300 switcher.

Abekas also demonstrated multichannel capability for its previously introduced A52 digital special effects system.

Also new in the effects arena was the NTSC component version of DSC's Illusion system, which accepts RGB or Y, R-Y, B-Y inputs. DSC developed the component Illusion system primarily for overseas users.

Of interest closer to home was the new DSC Alpha 2000 low-cost (under $20,000) character generator/digital effects system, which uses some electronics manufactured by Chyron and is available in NTSC or PAL. Titles and logos can be manipulated and positioned anywhere on the screen. DSC also showed its still store option for the Illusion, Frame File.

Quantel, as usual, drew crowds with its effects equipment, including Encore, "a new generation in digital effects," and Mirage.



Quantel's Harry demo.

One of the classiest low-end effects systems was Fairchild's CVI (Computer Video Instrument). A lap-held keyboard with slide faders lets the user create a variety of arty effects with live video in real time. A small bit pad, part of the same keyboard, allows creation of graphics.

The CEL Electronics EFX-1 and EFX-2 digital effects controllers and digital frame store were featured at the booth of Grunder & Assoc.

Microtime displayed its latest programmable efx system, Genesis 1 ACT 1. The three-channel, $27,990 system features composite and component inputs and outputs.

Paltex showed an upgraded version of its Gemini effects system that keeps up with real time, staying in sync with audio, and features split image, mirror image, wipes, dissolves, mosaic and luminance efx.

Ultimatte demoed the excellent matting quality of its Ultimatte 5, with two Beta tapes as sources.

Graphics Systems Get Fine-Tuned

There were few *new* graphics systems at this year's SMPTE show, if you adopt the strict definition of "new." The abundance of improvements and upgrades in previously exhibited systems, however, sometimes made it seem that way.

Quantel's most exciting announcement was its new high-definition Paintbox system, based on the popular Paintbox but designed for the 1125-line, 60-field HDTV standard. Harry, Quantel's digital cel animation recorder and editor, was demonstrated on the floor throughout the show.

Quantel also had new V.4 software for its standard-definition Paintbox, including a "blur" brush, a "tack" function that allows cutouts to be placed down temporarily before permanent placement, and a "confirm" mode.

The Abekas A42 Video Slide Projector.

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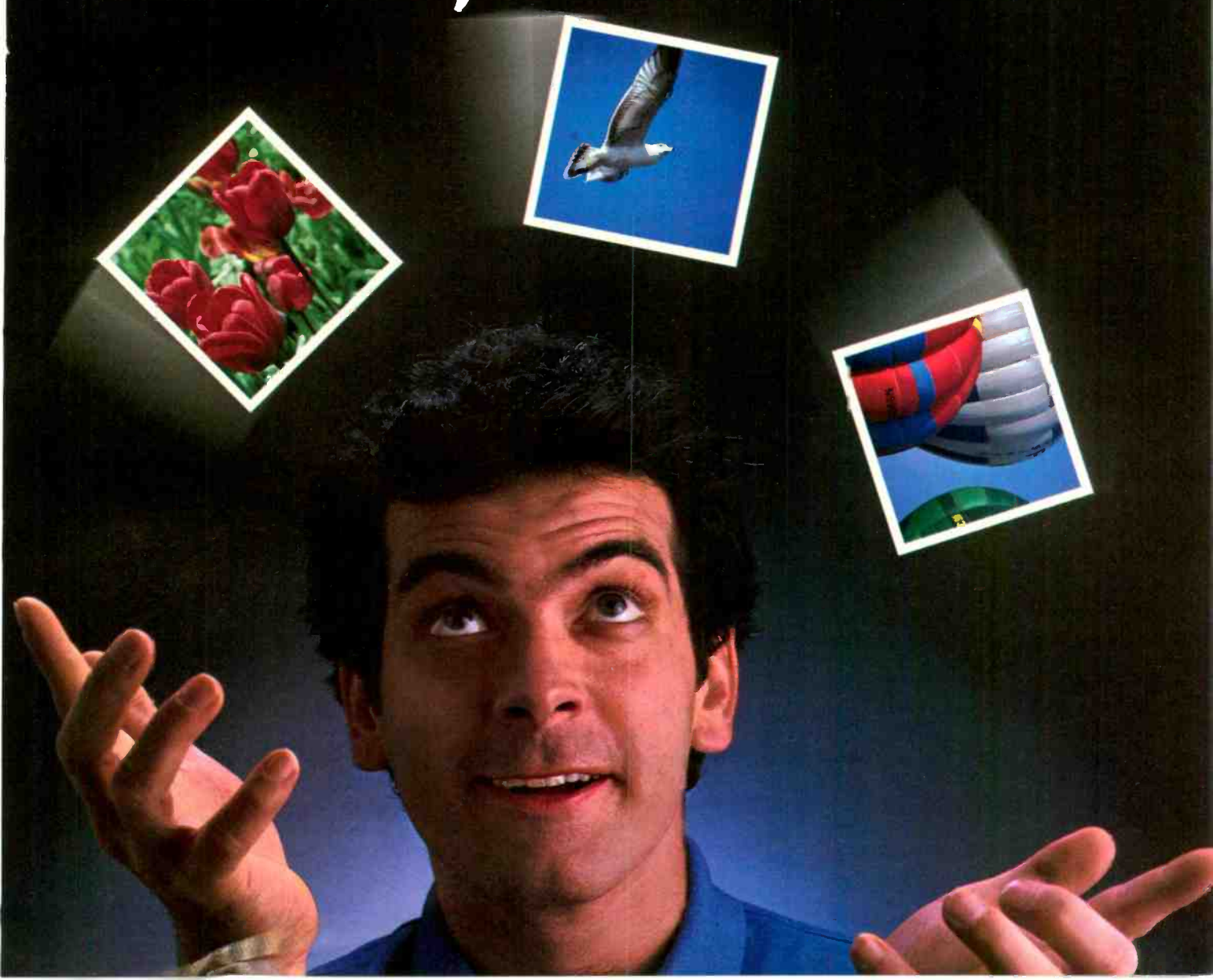

Chyron Scribe.

New graphics software was also in evidence at the Bosch booth, where crowds massed to see live demonstrations of the FGS-4000. The new 3D illustrator package allows three-dimensional objects to be created, manipulated, and painted as part or all of a scene. Other new features of the FGS included the capacity for 16 animatable light sources; a terrain editor that generates complex land surfaces; and a 25 times increase in texture mapping speed.

At the ColorGraphics booth, new software for ArtStar II included a vector-type software package for extra-high-quality, anti-aliased type and symbols. Just the week of the show, ColorGraphics released a flash digitizer that grabs frames of live or rolling video in real time, giving the ArtStar II frame store and frame grab capabilities.

Other previously seen graphics systems also attracted attention. Cubicomp's PictureMaker 3D modeling and animation system was demonstrated with enhanced software. The $29,500 PictureMaker is now also available in a 625-line PAL version.

Aurora's Aurora/75 system, based on the IBM PC AT, made its first SMPTE appearance. The basic system offers 3D perspective, real-time color animation, automatic line and curve drawing, anti-aliasing, and many other features.

A much-heralded exception to the lack of new graphics gear was Chyron's Scribe text generator. Scribe aims to reproduce today's digitally created print typefaces with a faithfulness heretofore impossible. Choosing from a library of 500 type styles, the user can create an unlimited range of sizes, from 10 lines to full-screen. Sixteen levels of anti-aliasing maintain type details and provide a polished appearance.

For most standard TV applications, of course, Scribe will not soon replace the Chyron IV. That industry workhorse was shown in an expanded version with 12 online fonts, 3D rotated graphics, offline editing, automatic curve drawings, and other sophisticated features.

Aston Electronics featured its Aston 4 character generator, a sophisticated CG designed to function on the level of the Chyron Scribe. Aston has a library of 1500 typefaces for the system, derived from high-resolution data supplied by West Germany's Stempel AG. The operator uses the master to create an anti-aliased display font, which can be any height from 10 to 100 TV lines. The display font is then recorded onto a disk for recall.

Dubner is still updating hardware and software on the CBG, now designated the CBG-2LX. It is now delivering the third plane. This top-of-the-line character generator and animation system sells for $115,000.

The recently introduced Texta character generator, priced in the $42,000-75,000 range, was also displayed. Removeable 10 Mbyte I-Omega hard disks make Texta and the CBG compatible with each other. Texta has no 3D creation, but will run 3D graphics created on the CBG. Two other relatively new character generators, the 10K ($13,500) and the 20K ($18,500), were also shown.

The newest item from Dubner was the DPS-1 paint system, a standalone unit with third plane that starts at $20,000. Deliveries start in January.

Thomson-CSF featured its Viditext II character-generator, a more economical (under $50,000) version of the Vidifont Graphics V. Optional features include animation, time sequential overlays, Vidiclock time display, and a playback sequence controller.

The Artronics Studio Computer was featured at the 3M booth. A recent software addition to this PC-based system is New Paint, which allows color editing of already created graphics. 3M also showed the D-5000 character generator.

The newest feature of the Abekas A42 Video Slide Projector was an advanced library system designed to speed complex word searches, even if the user misspells the desired word.

Rank Cintel showed its electronic still store system, the Slide File. Rank has signed an agreement with a company that has a Logica-developed still store library system based on the Slide File. Called the Picture File, this slightly modified system is designed to compete directly with Harris Iris and Quantel still stores.

Comvid showed the Image Master, an animation controller that controls almost any VTR to record one or more frames at a time. It keeps track of in and out points and converts time code to frame numbers.

Explosion in Image Processing

These days you can't count on anything standing still: even the most basic of digital TV products, the

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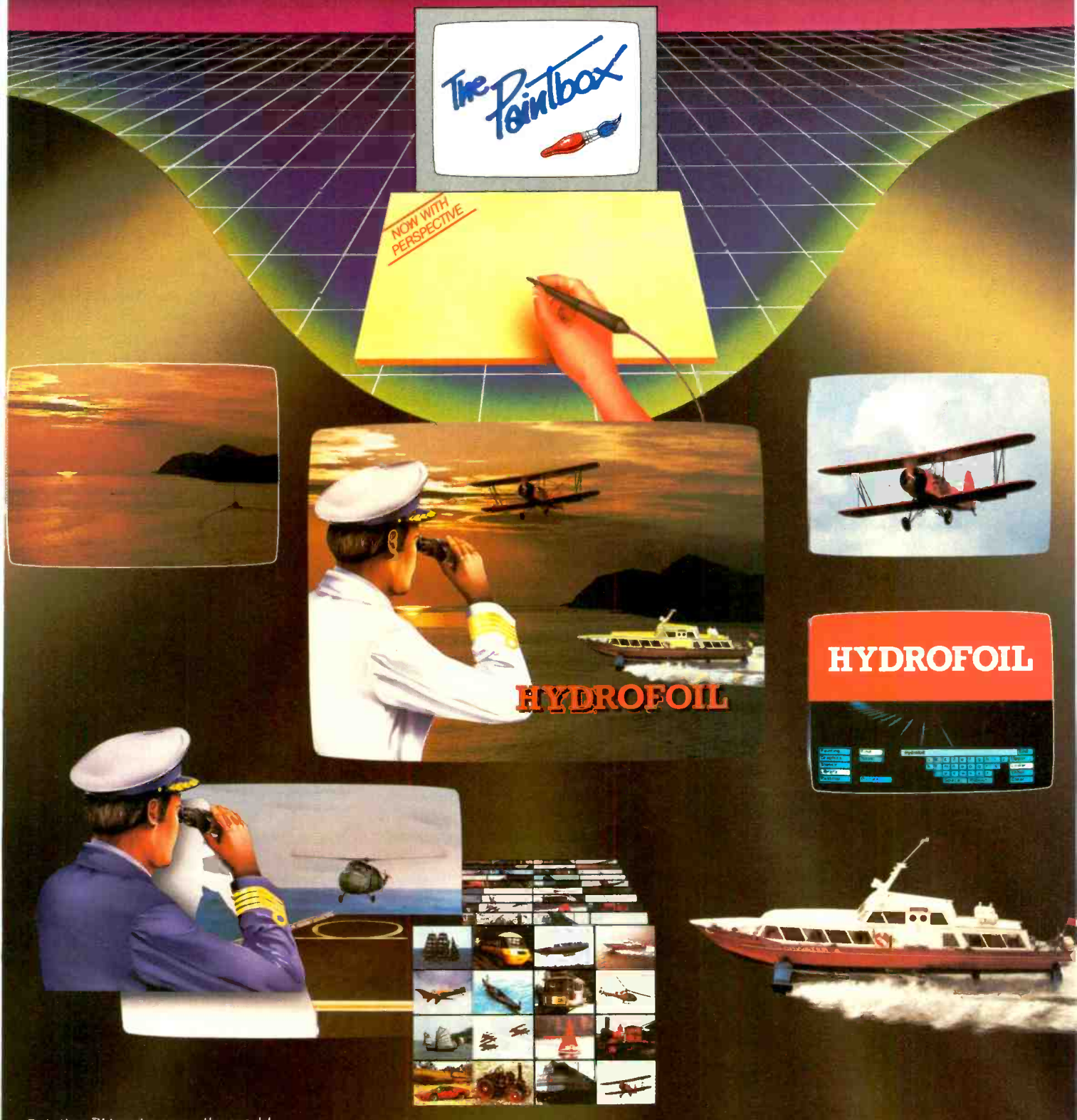

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TBC, continues to evolve. The fall SMPTE show saw the announcement of the most prestigious TBC ever—the Ampex Zeus—along with the entry of yet another manufacturer, Lenco, and a surprising number of brand-new models from companies long in the field.

The Ampex Zeus is not only a fourth-generation TBC but also an advanced video processor for Type C VTRs with some remarkable variable motion capabilities. Ampex says that Zeus virtually eliminates the picture "hopping" or "blurring" usually associated with slow motion and program compression correction devices. Thus, it allows broadcasters to juggle program and commercial ratios without visible image degradation.

A line-by-line interpolation technique removes interfield vertical motion during slow-motion sequences. It also improves vertical resolution in the freeze field mode. Adaptive comb filtering improves picture quality during variable speeds.

Lenco made its entry into the TBC arena with its new TBC-450, designed with state of the art components for low cost ($5450), high performance and dependability in a 1 ¾-inch-high rack unit. The unit requires no external cooling and is rugged enough for field use. It handles both heterodyne and direct color VTRs.

An unusual entry, aimed primarily at the corporate and industrial post-production market, was the Pyxis, made by ALTA Group and shown by Convergence Corp., which is selling it. This "integrated video workstation" contains two 16-line window TBCs for A/B-roll editing, a sync generator, and an audio mixer with five stereo inputs, all in one chassis. In addition, it has the ability to take live camera inputs. It lists for just $6500.

Nova added a significant new product to its line of TBCs with the Nova 620, a full-frame time base corrector that lets the user instantly freeze a field or frame of video for special effects applications.

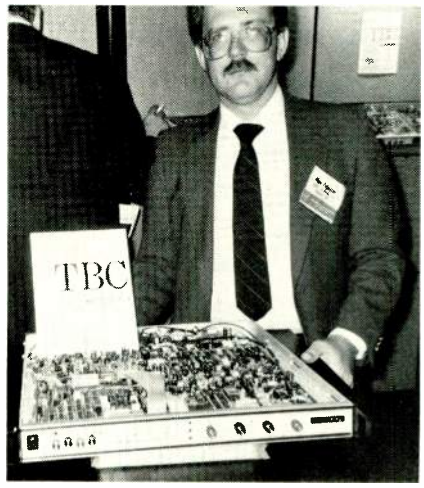
Ampex Zeus processor.

A new three-channel component frame synchronizer that incorporates a time base corrector and digital video effects generator as well was shown by Shintron. Called the Andromeda 3000, the unit is part of a complete package of component video devices. The Andromeda 3000 features a new data capture method called "S-cube," using an ultra-high speed clock to capture incoming picture information.

Taking advantage of the latest circuitry, Scientific-Atlanta's Digital Video Systems Div. introduced three new low-cost items: a $4990 TBC, the DPS-170; a $4990 frame synchronizer, the DPS-165; and a $6990 combination TBC/framestore. All are in a single thin rack.

JVC introduced the new SAT-100U digital TBC, priced at $7995.

Other products in the TBC/frame synchronizer/effects category at SMPTE were previously shown at NAB '85. These included Leitch's new frame processor,



Lenco's new TBC.

Hotronic's synchronizer and TBC, For-A's FA-450 component TBC, and Fortel's differential phase/gain monitor. For-A also featured its new low-cost digital TBC with multiple digital effects, the FA-440. Hotronics' AE61 TBC is now in production.

Transimage International was on hand with its system for time-sharing a TBC. The TS 102 offers a convenient way of connecting four VTRs and one TBC into a system on a "one-at-a-time" basis.

Comvid featured its RGB-30 full function sync generator/RGB encoder for converting RGB computer graphics signals to NTSC video.

The new Acron Video 605N NTSC encoder, which handles any component signal, made its debut at the Listec booth. Price will be around $4000.

AVS America featured a new standards converter, the AVS-6500, which minimizes motion "judder" by a new switchable method of interpolation.

Old Powers Return in Switcher Market

Perhaps the most important news on the production switcher front was the strong comeback being staged by two well-known switcher manufacturers. Vital Industries is truly revitalized, as was made clear by the introduction of a major new switcher—the 3000 Series—as well as a new digital video manipulator (still in prototype form). The 3000's mix/effects systems, expandable to three, are all bi-level: an "upstream" level for mixing, non-add mixing, wiping, video keying, and chroma keying, and a "downstream" level where four video keys may be added. A full-input key bus in each M/E expands the key source selections.

Vital's upcoming new digital video manipulator, called Magic, drew a great deal of attention. With nothing more than a color touchscreen and a three-axis trackball, effects generation is easy.

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- *Integral VTR formats: M, Beta, ¼"*
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Also showing every sign of being a strong force was Intergroup Video Systems, which came to SMPTE with a new 16x1 video routing switcher, called Suite 16, which uses the hexidecimal code to condense data into a limited space. The result is 16 inputs in the same value package ordinarily accommodating 10 or 12 inputs. It has a low price tag of $650. An associated effects unit, EFX Suite 16, offers several features not heretofore available in a small switch matrix. Priced at $1150, this unit includes a preset mode that allows a second input to be selected. Intergroup also featured its microprocessor-controlled 8001 mini-master control system, first shown at NAB and now in production.

For-A's component post-production switcher, the CVM-500, was on view again after its NAB introduction. At the show, the company announced the formation of the For-A Broadcast Product Group, a national sales and service organization.

Routing switchers were well represented at SMPTE. Image Video Limited featured its latest, the Model 9600, described as the first of a new generation of high-density routing switchers. This switcher will handle both MAC and HDTV signals.

Hedco announced a new 12x12 A/V routing switcher, the HD-12, to fill the gap between its 8x8 and 24x24 units. Also new from Hedco was a video-activated 117 V power switch.

Dynair stressed its SMPTE/EBU-compatible System 23 machine control system and routing control schemes more than its routing switcher line. Graham-Patten Systems featured its versatile routing switcher line.

Bosch introduced a new line of signal processing equipment including audio and video DAs, pulse, sync, and subcarrier amps.

Familiar routing switchers were shown by Central Dynamics, Di-Tech, Dynair, Grass Valley Group, 3M, and Utah Scientific.

Production switchers to handle component signals were prominent, but all were previously shown at NAB: the Grass Valley 100CV, the Shintron Empress 2000C 12-input A/B bus production switcher, and the For-A CVM-500. Ross showed the RVS 210 and Echolab the SE-6, both unveiled at NAB.

Vital 3000 production switcher.

New to the U.S. was the Polar Video PVM-1 switcher, on display in the Listec booth. Listec will be the distributor of this self-contained four-input switcher priced at $2495. Larger production switchers and master control units were, of course, shown by Central Dynamics and Grass Valley. GVG also showed a new series of 16x16 building blocks for its Horizon routing system..

Northwest Spawns Video Test Equipment Boom

Textronix's influence in the test and measurement field has started spreading abroad as former Tek employees form their own companies. One of these is Audio Precision, whose System One is described in the audio test equipment section.

Another company made up of former Tektronix people, Magni Systems, Inc., introduced the Model 2015 Personal Computer Aided Television Synthesizer (PCATS). The computer makes it practical for engineers to generate custom test signals—necessary as the industry moves into new formats such as MAC and HDTV.

Magni's other new product exemplifies another new direction: integration of a precision digitally synthesized test signal generator with a combined waveform monitor and a vectorscope. It involves two units: the 1520 Integrated Measurement Package (IMP) and the 1525 IMP display monitor.

Despite the advent of these new Beaverton/Portland companies, Tektronix's output continues to be impressive. Tek premiered three new products at SMPTE: the new SPG-170A NTSC sync generator, the WFM-300 component analog video monitor, and a new BTSC modulation monitor and decoder.

The SPG-170A NTSC sync generator is a compact unit combining RS-170A sync, digital genlock, and a high stability color standard with a versatile set of timing controls. The WFM-300 waveform monitor accommodates signals in the component format. In addition to a unique "lightning display" that shows the relationship between the luminance and color components, it also has all the capabilities of a complete waveform monitor with parade and overlay modes. Although it was first introduced at the NAB show, the Tek TSG-300 component generator got much attention at SMPTE. The show-stopping 751 BTSC Aural Modulation monitor is described elsewhere.

Several new video test products came from other quarters. Videotek introduced the TSM-60 waveform monitor, designed for easy use. Selection of inputs, filter response, and time base sweep are accomplished via front-panel pushbutton switches. Videotek also added a new wideband video distribution amplifier to its line, suited for HDTV.

Sigma Electronics introduced three new units to its 100 Series line. They included the BSG-100 black signal generator with two black burst outputs, the CBG-100 color bar generator, and the BTM-100 black burst timing module.

Shibasoku was present with its usual full line of test equipment, including a component video signal generator and two products for high-definition TV, the CC070A6 encoder and the CM65A high-definition color monitor.

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The Budget Squeezer

The Video Compression System With One Feature All Others Lack: Affordability.

Everyone today is facing the budget squeeze one way or another. Networks, affiliates and independents. Cable companies. Production and post production houses. One curious thing about budget squeezes is that they have a way of making equipment purchase decisions both easier and harder. Easier when it's clear that a particular item costs too much for the times. But harder when you are looking at equipment you know you need, but can't find the bucks for.

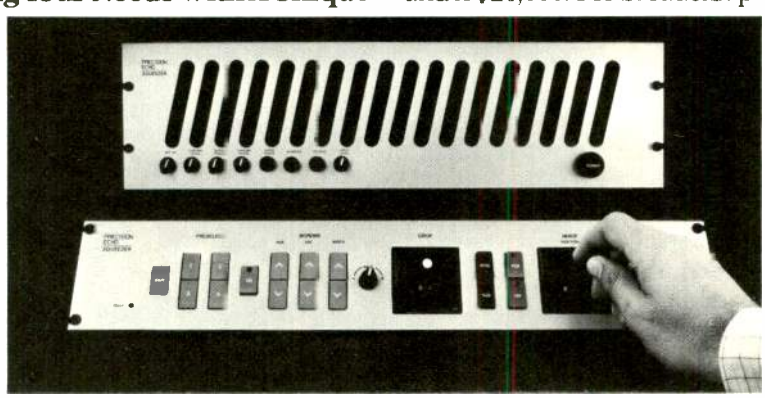
The Squeezer: Meeting Your Needs With A Unique Set of Special Effects Features.

The Squeezer, from Precision Echo, is a programmable video compression and positioning system that compresses an image down to four selectable sizes, places that image anywhere within the screen on command, crops any part of it to any size, and puts a variable-sized border of any color around it on request. It can even flip the image horizontally or freeze the action. Exclusive dual joy stick controls make image manipulation simple. And the utility of its design makes The Squeezer a versatile tool whether rack mounted in a production facility or used in mobile applications.

The Squeezer: An Affordable Alternative.

There's very little that you'll find on The Squeezer that you couldn't find on an ADDA, Vital, or a Quantel system. Except the price tag. Those other systems cost anywhere from $40,000 to $200,000. The Squeezer costs under $20,000. For broadcast programming, news and sports production, cable TV, educational and industrial applications, nothing comes close to the cost efficiency of The Squeezer.

The Squeezer from Precision Echo. High on quality and cost efficiency.



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Sony's auto setup monitor.

Drawing considerable attention was the Horizon International remote control/analyzer system for monitoring and controlling transmitters, introduced at NAB.

In monitors, Sony introduced a new eight-inch field monitor, the BVM 8021, with 400-line resolution and ac/dc operation with BP-90 or NP1 battery. Sony also featured the new auto setup system its for BVM-1900 monitor.

New Media Meet Old in Video Recording

Video recording technology, an area that continues to broaden with the introduction of new formats and media, generated news and interest SMPTE. Technology exhibits, one featuring analog and digital component video recording technologies, the other exploring the potentials of enhanced NTSC, illustrated the new directions. (Both are described at greater length in this month's story on new signal architectures, p. TK.) And just two weeks after the SMPTE show closed in Los Angeles, SMPTE announced that the CCIR had arrived at a recommended format for component digital video recording; see news story in this issue.

Back in the present, Optical Disc Corp. had some new grooves in its laser disc recording system. The 610A, as the latest model is known, is now convertible from NTSC to PAL; the previous version was for NTSC only. The system sells for $200,000 including Tektronix monitors and premastering encoders.

The newest nontape medium for video, hard computer disks, was represented by Abekas, which again showed its A62 digital disk recorder. Intended more for animation and videodisc mastering applications, the high-perfomance A62 is available in 50- and 100-second versions.

If plain old tape recorders seem pedestrian after this, it's not the manufacturers' fault. In fact, the new recording media have hardly scratched the dominance of the tape-based recording systems, and it is unlikely that they will for the next few years.

While few all-new VTRs or VCRs were introduced at SMPTE, a sprinkling of new units peppered the floor. The most significant announcement from Panasonic was a new broadcast-quality MII format studio recorder, the AU-600, which had an "interim introduction" at NAB and will make its final debut at NAB '86 as part of a new family of equipment. Panasonic also showed its M-format equipment, including its M-format MERPS system, the MVP-100.

Although most observers predict an uphill battle for ¼-inch video in the face of half-inch's success, Bosch remains bullish on its Lineplex format and plans to have Quartercam units available in the U.S. by NAB time.

Panasonic MVP-100 MERPS player.

No brand-new VTRs or VCRs were seen at the Sony booth, but the company introduced a line of "mini consoles" for its BVH-2000 Series one-inch recorders. Installed as an overbridge above the recorder, the mini console includes TBC remote-control functions, audio monitoring, and optional nine-inch color monitor and Tektronix combined waveform monitor/vectorscope. Sony also had an improved barcode printer for its Betacart multicassette system.

Ampex and Hitachi both displayed their established lines of one-inch Type C VTRs.

In the very active U-Matic field,

AFA's Pegasus system.

JVC introduced its new CR-850U ¾-inch editing recorder/player. First seen at RTNDA, this $8600 unit is a full-functioned, front-loading VCR with all editing functions.

A couple of interesting U-Matic modifications were shown by a new company, Vid Video: The Shuttle 1 Mod, which puts a control knob on a Sony 5000 or 5600 U-Matic deck, and Shuttle II, an interface that allows a 5000 or 5600 to be used as a source deck.

Broadcasters wondering what was to become of Silverlake after RCA's retreat from the broadcast industry found the answer just inside the SMPTE exhibit hall doors. Odetics, the system's developer, has taken over marketing of the M-format cart system. Now renamed the TCS-2000, the system can accommodate up to 280 20-minute cartridges and four to six M-format players.

Asaca announced that Grass Valley subsidiary Dubner Computer Systems will do the software development for its ACL-6000 MERPS player.

Lake Systems has completely redesigned the software for its La-Kart on-air playback system. The most significant change is La-Kart's new multichannel capability, allowing one channel of video and two channels of audio to be routed to multiple outputs.

A.F. Associates' Pegasus 5100 commercial compilation system received its first SMPTE showing.

Growth but Few Surprises in Post-Production

As usual, editing system manufacturers descended on SMPTE in force. The most significant introduction was CMX's brand-new 3100 large-scale editor, a replacement for its popular 340XL. The 3100 controls up to six source and one record audio or video machines, plus an auxiliary source. It has an expanded array of time code functions, an EDL autoclean routine, EDL autoscroll, four user-programmable learn keys, and additional hardware options and

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For stage reinforcement, podiums, news desks, or for hiding in sets, the PCC-160 offers superior performance.

And because the microphone is mounted on a boundary, direct and reflected sounds arrive at the diaphragm in-phase. The result...wide, smooth frequency response free of tonal coloration or unnatural sound which can occur with conventional microphones.

Self-contained electronics eliminate the need for a sometimes awkward in-line preamp box. The PCC-160 can be powered directly from the console or other remote power source. Or if battery power is convenient, a battery supply unit can be inserted anywhere in the mike line...right up to the console or mixer.

For maximum flexibility, the PCC-160 features an exclusive three-way "bass tilt" switch which allows you to tailor, up or down, the low-end response for special applications or unusual boundary sizes.

Due to its low profile and "go away gray" finish, the PCC-160 microphone becomes nearly invisible in use, making it ideal for the stage, newsroom or lectern top.

But beneath its cloak of dark gray, the PCC-160 is protected by a heavy-gauge, all-steel body, tough enough to stand up to even the most severe abuse.

The PCC-160. A microphone meeting the needs of today's sound professional with today's most advanced technology.

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Droid Works' EditDroid.

maintenance functions. Prices start at $30,000; an average system would run about $45,000.

CMX's new Multi I², introduced at NAB, was featured, along with the new 330XL mid-scale editor, the 3400 and 3400A large-scale editors, and The Edge three-machine editor.

The news at Convergence was not editing systems per se—the company's 204 and 195 editors were featured—but rather the Pyxis digital video production system, described in the section on signal processing.

EECO showed its A/B roll IVES II system, now interfaced to the Ampex VPR-80 VTR and to the Tascam 58 eight-track ATR. New V2.4 software for IVES II provides full stereo audio editing and monitoring. The company also announced a new cuts-only switcher, the ES-900, for its EMME editing system.

Droid Works featured its EditDroid system, substantially unchanged since its last show appearance and gaining increasing acceptance at post-production facilities.

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Also on hand was Montage, showing a portable version of its Picture Processor both at its booth and at the Panavision hospitality suite at the Bonaventure.

Featured at the Paltex booth was Abner, an updated version of the ABR-1 editing system. The company also displayed its top-of-line editor, Esprit, and two versions of the Edit-Star: ES-1D (with Backtrac) and the ES-1P "producer" version with a 500-event EDL.

Color Systems Technology, a company new to SMPTE, introduced the VECS-8000, a $4500 modification that interfaces the Sony BVE-800 editor to an IBM PC to add storage and EDL management capabilities.

BHP showed the EnVision off-line video editing system, which was shown at last year's SMPTE but skipped NAB. Designed for film origination and release, video, or any combination, EnVision is frame-accurate for both picture and sound in sync.

JVC's new RM-G850U editing controller, priced at under $3000, is now ready for delivery.

Elecon has substantially reduced the price of its EM-7100 video editor to $24,000 for a system with 500-event memory, four GPIs, three deck interfaces, and list management.

Gray Engineering Labs featured its DT-213 SMPTE time code transmitter and FC-142 film counter/character generator, both introduced at NAB.

Telecines

Because SMPTE itself represents a meeting between film and video technologies, the action in telecines and related devices at the show was especially appropriate. Lately, increasing interest in video-generated special effects has focused attention on film weave in the Rank Cintel flying spot scanner, particularly noticeable in special effects work. Rank's anti-weave gate reduces weave drastically, to 20 ns, but does not completely eliminate it.

At SMPTE, this problem was addressed by a new company, Steadi-Film Corp. of Nashville, which introduced a gate for the Rank that the company says eliminates weave entirely. Designed primarily for graphics and effects applications, the Steadi-Film unit is a pin-registered gate with its own microprocessor control. It interfaces with the Sony BVH-2500 or Ampex VPR-3 to perform frame-by-frame transfers at a rate of 40 frames per minute. Unlike the standard Rank gate, which moves film through the machine in a continuous stream, the Steadi-Film gate stops each film frame so that frames can be recorded onto video one at a time. The Steadi-Film gate sells for $35,000 (expect a price increase soon) and has been purchased by The Post Group, Editel, Action Video, The Tape House, and others.

Rank, of course, continues to sell its own anti-weave gate; another one is the Steadi-Gate, manufactured by Cinema Products and seen at last year's SMPTE. New options for Rank's Mk IIIC and Amigo controller included a "shot change detector" that senses when a dissolve, cut, or other "drastic change" occurs on the film in the run mode. Frame numbers of changes are automatically toggled into the Amigo, speeding on-the-fly, real-time color correction.

Other telecine manufacturers continued to press forward. Bosch announced full X-Y zoom capability for its FDL-60.

L-W International premiered the Model 224-ESD low-cost transfer system, aimed at the educational/industrial market and priced at $5511 plus camera.

Ampex introduced a digital image repositioning and zoom unit for film-to-tape transfers, the ATX-100.

In color correction, VTA Technologies introduced the da Vinci scene-programmable, 16-vector color corrector.

Convergence's 204 editor.

Mature Camera Industry Takes a Break

The camera field may have been subdued at NAB, but at SMPTE it was positively catatonic. Anyone following broadcast cameras for the last year or two would have seen virtually everything shown at SMPTE.

Among the significant, recently introduced cameras on display was Hitachi's economical Z-31 camera in a brand-new Plumbicon version, the Z-31P. The top-of-the-line SK-110D, seen at last year's SMPTE in prototype and at NAB in production, was again on view.

Sony again featured its innovative BVP-360 ⅔-inch computerized studio camera. Deliveries of

this long-awaited camera are scheduled for the first quarter of this year.

Ikegami's Harvey Caplan says his company has signed an agreement with Sony to sell Betacam recorders in conjunction with the HL-95 Unicam. This sales and marketing agreement does not constitute an Ikegami endorsement of the Betacam format, Caplan emphasizes; the Unicam will still accommodate any recorder the user desires. The company's display featured the HL-79 Series, the ITC-730, and the recently introduced SC-500.

Other previously introduced cameras remembered themselves to SMPTE attendees. Philips showed its full LDK 6 camera family. Thomson-CSF displayed the

Hitachi SK-110D studio camera.

TTV 1623 and TTV 1624 French-made Betacams, and JVC and Panasonic both featured their economical ENG/EFP camera lines.

Gone but not forgotten was the RCA CCD-1, introduced with such fanfare at NAB 1984. The demise of RCA's Broadcast Systems Division leaves the future of the CCD-1 somewhat in question, although a source close to the company hinted that a deal, perhaps with an overseas manufacturer, may be in the works. With the CCD-1 out of the picture, NEC remains the only manufacturer currently offering a broadcast-quality CCD color camera. The SP-3A was again featured at SMPTE.

Lenses

The news in lenses, too, was less than earth-shattering. Canon announced that it and Hitachi had signed with CBS for the sale of Hitachi SK-970 cameras plus 30 JS40x9.5 lenses and 17 J18x9 lenses with diascopes.

Angenieux introduced a new nonrotating front for its 8-112 mm, f/1.6, 14X super wide angle ENG lens. This feature allows the use of special effects filters without a special filter holder.

Schneider's established TV44 14x9 ENG lens now has positional servo focus control so that the position of the handle always corresponds to focus position.

Fujinon emphasized its 20x14.5 large studio lens, 16x9.5 ENG lens, and the wide angle 7x7.

Schwem reports "growing backorders" for its Gyrozoom image stabilized lens.

In camera accessories, Cinema Products featured the Insight Vision Systems director's viewfinder

INTRODUCING THE SMART SWITCH FOR MTS BROADCASTING

With the advent of MTS broadcasting, many TV stations are turning to stereo simulators to accomodate programming material that is still monaural.

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The solution? Studio Technologies' new RCU-1 Recognition Control Unit.

The RCU-1 determines whether the audio input is mono or stereo and automatically cross-fades the stereo simulator in-circuit when mono is detected. It can also be used as a dedicated mono/stereo recognition device when connected to a broadcast video tape recorder.

The RCU-1, used with Studio Technologies' AN-2 Stereo Simulator, is a must for stereo TV broadcasters. The RCU-1 is also compatible with other stereo simulators.

For more information and the name of your nearest dealer call Studio Technologies, Inc. at 312/676-9177.

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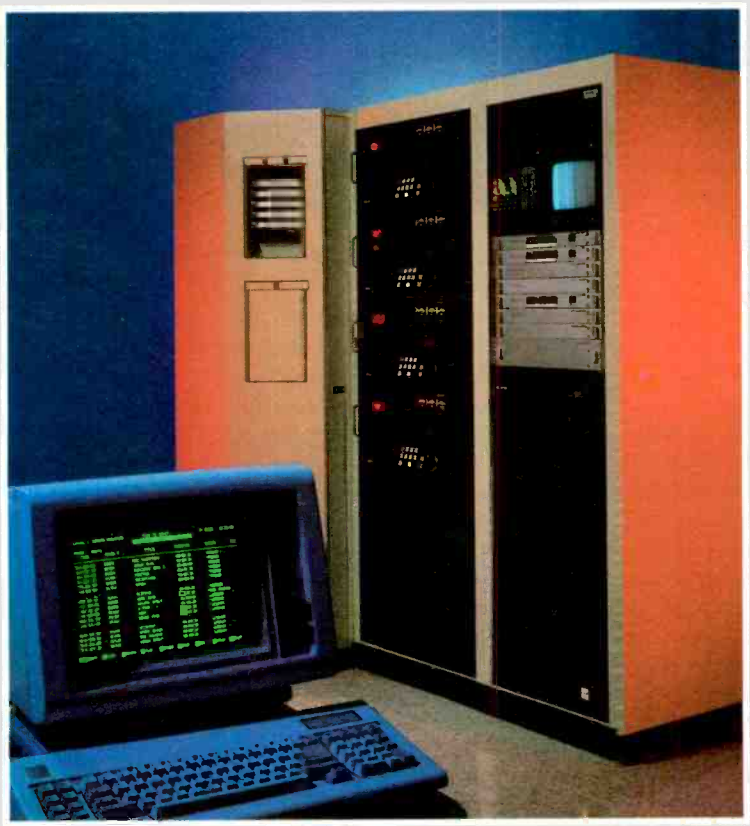

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The Cart Machine automatically manages, records and plays-to-air all forms of spots and programs, giving you much more uninterrupted time away from programming concerns.

The Cart Machine holds up to 280 carts on-line. Tracks 65,000 carts in the database. With its 1,000 event look ahead feature, you receive a printed list of needed carts and your saturation spot carts never have to leave the machine.

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system for film cameras. Listec introduced the Polar Video safe area generator for ENG camera viewfinders.

At SMPTE Audio Exhibits, Time Code Abounds

If SMPTE was a quiet show, audio manufacturers didn't seem to have heard about it. They came with an array of new products in all categories. Many had been seen previously at the AES show. But a few new directions, unheralded by AES, appeared at SMPTE.

In a private suite, Lexicon demonstrated its new concept—not yet a product—in digital audio editing. Called Project RDI (for Random Access Disk-Based Processing), the machine utilizes computer technology and a nonremovable hard disk drive to record, play, edit, overdub, mix, pan, and perform all audio editing functions digitally.

CMX's CASS 1 audio editor.

Lexicon has designed it to appeal to audio editors by simulating the cueing sounds made by rolling tape over tape heads. The demo involved six tracks and six channels, but Lexicon is trying to get industry feedback and may expand these. Lexicon predicts a product intro for the third quarter of 1986.

Other audio editing and synchronizing products also made news. CMX's CASS 1 computer-aided sound sweetener, seen at NAB as an engineering prototype, came to SMPTE as a full-fledged product. CASS provides not only full audio editing capabilities, but also audio console automation.

As part of its System 2600 time code and synchronizing products, Adams-Smith introduced the 2600 RC remote controller, a prototype audio editor with five-machine remote control and full transport. The company calls it "video editing concepts applied to audio."

Amtel showed its Soundmaster audio editing system, introduced at NAB. According to a spokesman, Amtel is at work on developing its own synchronizer; look for an NAB introduction.

The Droid Works, which introduced its SoundDroid all-digital audio editing and mixing system with much fanfare at NAB, was demoing the system again and delivered a paper describing it.

In another paper, Compusonics engineers described a digital audio editing system, the DSP 2002,

The TSM advantage.

- **A price and performance breakthrough ...the HS-100P is the latest microprocessor controlled high speed preset Pan/Tilt System.**
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Call or write for complete details on the HS-100P and TSM's complete line of Pan/Tilt heads and accessories.

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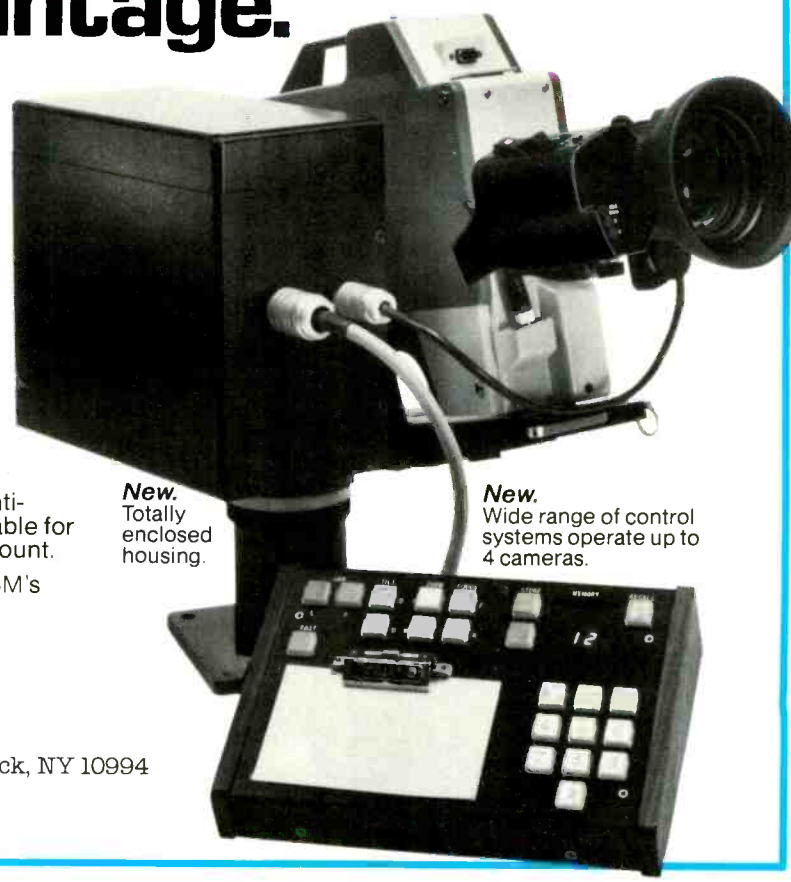

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SUPER POD™ (sōō′ pər pod) *noun* 1. A microwave transmit/relay system used with ENG helicopters: enhances and extends the coverage capabilities of television news departments. 2. Nurad's advanced airborne ENG system featuring an automatically rotated transmit antenna; incorporates a sophisticated Loran C control system.

THE SUPER POD CONCEPT

The operational concept of the SUPER POD is sophisticated yet simple. As the helicopter changes direction, the Loran C interfaced control system constantly computes the helicopter position and automatically points the transmit antenna toward the receive site.

SUPER POD features a unique circularly polarized transmit antenna and a circularly polarized receive antenna (for relay operations) housed within a sleek, aerodynamically streamlined radome.

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The SUPER POD radome is only 8.75 inches in height for maximum ground clearance under the helicopter.

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that is built around a Motorola 68000-based CPU and records on hard disks.

An Australian company, Editron, introduced the 500A A/V synchronizer, which offers lockup of 15 or more machines. Also shown was the 100A software interface device, an off-the-shelf synchronizer with 99-event ROM.

Evertz Microsystems introduced the Emulator, a $4000 A/V transport synchronizer. that permits audio tape recorders to be integrated directly into a video editing suite without an additional video machine and/or chase synchronizer.

Otari featured a prototype of its EC 102 synchronizer. TimeLine again displayed its Lynx time code and synchronizing modules, with updated software that makes the Lynx an ATR interface to Ampex, CMX, and GVG editors.

At its first SMPTE show, Fostex Corp. introduced a range of compact, battery-powered synchronizers from two to four transports.

Coherent Communications premiered a line of new SMPTE time code reader/inserter/generators.

Audio recording

This category is no longer limited to ATRs, as companies such as Compusonics are ably illustrating. For the first time anywhere, Compusonics had a working model of its DSP-1500/1200 digital floppy disk-based audio recorder, intended as a replacement for cart machines. The DSP is designed to resemble a cart machine, with the same configuration of control buttons. Expect full production by NAB. Tentative pricing is $3000 for the DSP 1500 recorder and $2500 for the DSP-1200 player.

In digital ATRs, Mitsubishi showed its new ProDigi standard X-850 32-channel digital audio tape recorder, introduced at AES and priced at $154,000.

In the DASH camp, Sony featured its PCM-3000 Series ¼-inch digital ATRs. Sony also showed an improved professional analog recorder, the APR-5000 Series, designed for sophisticated audio-for-video applications.

Otari's new MTR-20 Series microprocessor-controlled analog reel-to-reel decks, introduced at AES, came to SMPTE in three versions: ¼-inch two-track, with or without IEC center-track time code; half-inch two-track; and half-inch four-track.

AEG Telefunken announced that its M20 and M21 tape recorders are now available. The M20 comes in two-track or center track time code configurations with complete microprocessor control, programmable and stored level, EQ and bias alignments for four

This new QuantAural™ QA-100 Audio Program Analyzer gives you the advantage in competitive broadcasting

Simply put, the QA-100 quantifies what you hear. Your station sound can now be electronically monitored the way you hear it. Exactly. And, you can monitor the competition too!

Real time analysis of any audio signal. From a receiver, tape recorder, or processing equipment. You see the measurements as you hear the sound. Changes in processing or variations in system performance are immediately shown on the QA-100 panel meter or bargraph display—using program material as the signal source.

The QA-100 hears like a program director and talks like an engineer. With it you can monitor maximum peak level (relative peak modulation), overall processing effectiveness (average level), tightness of sound and processing control (peak density), tonal balance, consistency and preemphasis (four band real time analyzer), stereo image width (L + R to L – R ratio) and "punch" (special "aural intensity" measurement).

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tape speeds, and external synchronization capability. The M21 stereo deck is for less sophisticated operations requiring only two-speed operations, manual audio alignment, and no synchronization.

Studer Revox introduced the A820-TC recorder, a version of the A820 recorder with center track time code capability. Price is $11,500. The company also had a new pilot tone version of the A810, the A810-2-TC-FM-neo, which records and reproduces an FM pilot tone or SMPTE time code.

Several new ATRs graced the Tascam booth: the new ATR 60 reel-to-reel series with "Omega" tape drive transports; the ATR 60 2T quarter-inch three-track, three-channel head half-track machine, which runs at 7 ½ or 15 ips (15 or 30 ips operation is an option); and the ATR 60 2N, a quarter-inch two-track, two-channel machine without the center track head.

Also from Tascam, the ATR 60 2HS is a half-inch version with 15 and 30 ips speeds standard. It comes in a four-track version, the ATR 60 4HS. An eight-track model, the ATR 60 8, offers a choice between 7 ½ and 15 ips or 15 and 30 ips configurations.

Philips featured the LHH 2000, a new professional CD system that consists of three CD players and a microprocessor-controlled drive control unit.

Processing

Orban, showing its wares at the Harris booth, unveiled the new 275A automatic stereo synthesizer. Designed more for broadcast applications than previous models, the new unit answers MTS stations' growing need for synthesizing mono material. An important feature is audio-controlled switching between true and synthesized stereo; local and remote manual override control is available. The 275A automatically detects and corrects polarity-reversed inputs.

A useful and unusual item for MTS television stations was

"No more halftime headaches..."

"This new Telex headset is so light and comfortable I can finally leave my aspirin home. And, my engineer says I sound great!"

Charlie Jones

The newest Telex "Sportscaster" boom mic headset has the pros in the broadcast booth talking. Good news about the model PH-24 is spreading quickly among veteran sports announcers like network television sports announcer Charlie Jones. Imagine, a professional broadcast headset with full studio-quality, electret condenser microphone and optimum earphone receiver performance weighing a mere 2½ oz. (less cord).

NEW
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SPORTSCASTER
PH-24

Includes effective windscreen and push-to-cough switch. For complete information about this and other professional headsets from Telex, write to Telex Communications, Inc., 9600 Aldrich Avenue South, Minneapolis, MN 55420. For quick information, **call toll free**

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or in Minnesota call (612) 887-5550.

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Audio Developments from AES

Last fall's AES show in New York featured the latest and best in audio equipment from all the important manufacturers. Many AES exhibitors attended SMPTE as well, and their new products are covered in the accompanying story. Several major AES developments were not featured at SMPTE, however, and they are highlighted here.

In an important development in the digital audio field, Otari, AEG and Mitsubishi held a joint press conference at the AES convention announcing a new digital audio standard. The ProDigi, or PD (for Professional Digital) format will compete with the DASH (Digital Audio Stationary Head) format supported by Sony, Matsushita, and Studer.

Otari said it intends to manufacture machines with 32 channels on one-inch tape, with 24 and 16 channels expandable to 32-channel. Also included in Otari's product series will be a two-channel version with time code track and up to two hours of recording.

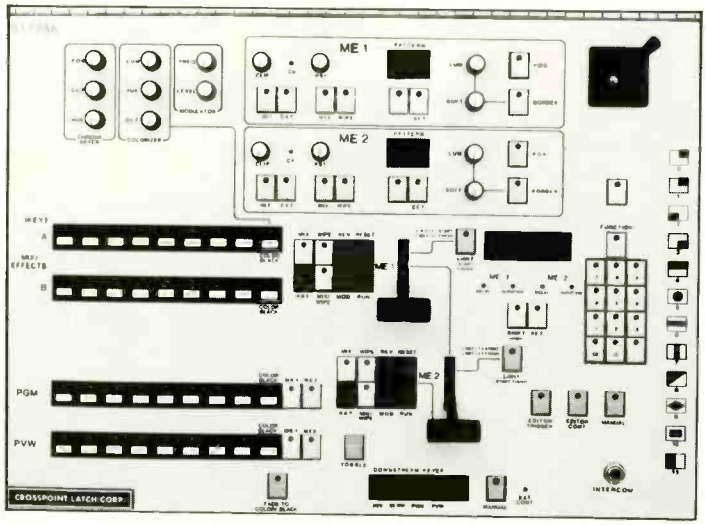
Audio Kinetics debuted the Eclipse editor, a new intelligent controller that allows four-machine editing with the Q.Lock 4.10 synchronizer. The Eclipse features 12 programmable function keys and can access an individual machine while performing an edit, thus allowing loading and cueing while the system makes edits. Also new was TimeLink, which cleans timecode waveform and converts standards.

Soundcraft showed the TV 24, a version of its TS 24 mixing console designed for TV and radio post-production and broadcasting. Optional 16-way routing matrix and extra 24-track monitoring facilities allow independent multitrack backup.

JBL introduced a new UREI 12-input broadcast console, the Model 1690 series, with optional Shallco or Penny & Giles attenuators. Also new were its 5547 one-third octave graphic equalizer, 5330 VCA-controlled mic mixer, and 6290 power amp.

The PM3000 mixing console, new from Yamaha, offers five-position attenuation pad switch and gain controls, eight VCA groups, eight group mixing buses and auxiliary buses, and a separate stereo bus. It is available with 24, 32, or 40 input channels.

6112AK MICROPROCESSOR CONTROLLED
TWO FULL MIX-EFFECTS SYSTEMS. EDITOR CONTROL



6112AK $11,282. 7239 $12,938.

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6112 with LED Buttons
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* AUDIO FOLLOW WITH Model 6800
* TWO MIX-EFFECTS SYSTEMS PERMIT MORE EFFECTS TO BE RECORDED IN THE FIRST PASS: REDUCING NUMBER OF GENERATIONS OF TAPE.

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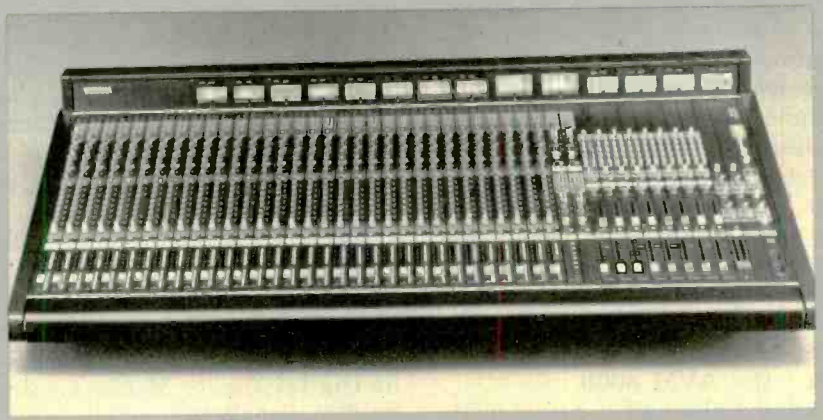

Yamaha PM3000 audio console.

Audio Developments premiered its first ENG mixer with a stereo output, the AD 260. The battery-operated unit has transformer balanced inputs and outputs.

Shown for the first time in this country was Fostex's Model 4030 SMPTE-based synchronizer, which is selling for $1500, one per slave. Fostex also unveiled the E-2 and E-22 studio mastering recorders, which feature microprocessor-controlled transports and record/play logic, plus center track SMPTE time code.

Panasonic unveiled several new Ramsa products. The WR-X01 is a compact, multiuse mixer featuring 12 inputs—eight stereo and four balanced mono. It has a stereo fader and built-in compressor, through which all mono input signals are routed. The WR-P01 is similar to the WR-X01 but also has a built-in 200 W per channel power amp.

Also from Ramsa was the WS-A10, a compact speaker that can handle up to 160 W of continuous program input. Ramsa also introduced a new 27-band graphic equalizer with high and low "shelving" filters to eliminate undesirable high and low frequency sound.

Audio Kinetics and Tascam announced the introduction of new chase synchronizer systems, the Pacer and Code 1, which are single rack space units that work with all international time codes. Both units feature an internal time code generator that is capable of jam sync operation and can be locked to house sync or an external video source. The twin dynamic readers are capable of reading code from 1/20 to 80 times play speed in both directions.

A new phantom-powered unidirectional condenser mic, the ATM33R, was unveiled by Audio-Technica. It's a a Lo-Z (150 ohms) model with a frequency range of 30 to 20,000 Hz. It features a compact lightweight design.

3M introduced its new Scotch 275 digital audio mastering tape, recommended for high density record and playback on DASH systems. The tape is inspected by a proprietary laser scanning system in the coating process to eliminate coated-in error and reduce dropouts. The new tape is intended as a direct replacement for Scotch 265 tape.

AKG introduced a series of microphones called the Ultra Linear Series. The C 460 B comb-ULS/61 is a condenser mic with cardioid response for surroundings with less than ideal acoustics. The C 460 B comb-ULS/62 is a condenser mic with omnidirectional response, for suitable acoustic surroundings.

You could

WIN: $1000

by answering three simple questions about a new product we've introduced in an ad which appears on a previous page in this issue.

We're anxious for you to see what makes this new boom mic headset different from the rest. So, we're willling to put your name into a $1000 drawing if you'll answer three simple questions about the PH-24. (Here's a hint. The answers are contained in the ad.)

Question 1—What TYPE of boom mic is used to produce the full studio quality sound discussed in the ad?

Question 2—How LIGHT (in ounces) is this lightweight headset?

Question 3—What HALFTIME PROBLEM has network sports announcer Charlie Jones eliminated since he began using the PH-24?

Hurry! Only those correctly answered entries postmarked before **Feb. 28, 1986** will be used in a random drawing held on **March 14, 1986**. The drawing will be performed by a neutral party. Employees and families of Telex or this publication will not be eligible. Winner will be notified by mail, and the winner's name and address will be available to anyone upon request.

Void where prohibited by law.

"No more halftime headaches..."

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Headset Drawing
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Minneapolis, MN 55420

Answer 1: _____

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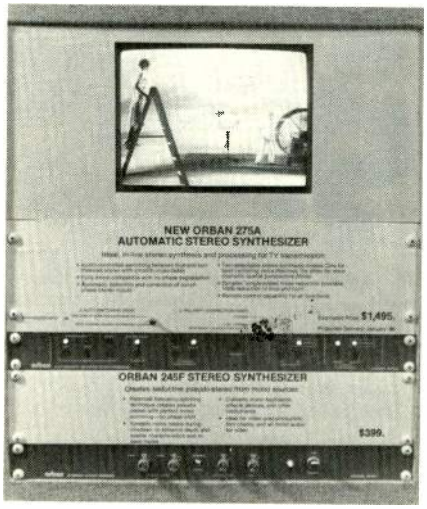

Orban 275A stereo synthesizer.

VISA, Merlin Engineering's Vertical Interval Stereo Audio upgrade kit for ACR and TCR cart machines.

In addition to the audio editing system already described, Lexicon demonstrated the PCM 70, a new digital effects processor incorporating MIDI control, at its booth. The initial software release can produce hundreds of sounds in time delay or digital reverb.

Aphex Systems introduced the Studio Dominator, a three-band stereo peak processor. The $1195 unit provides absolute peak ceiling and transparency below processing threshold during processing. Aphex also showed its new Surround-Sound decoder, an eight-channel audio vector matrix called the AVM 8000.

Dolby Labs had a new multitrack noise reduction package, the XP Series. It features up to 24 channels of Dolby A noise reduction.

Consoles and mixers

The Mitsubishi/Westrex/Quad Eight/DEC group came to SMPTE with a range of new products; Mitsubishi's new DATR has already been described. Also new from Mitsubishi was the Pro Audio SuperStar console, a multitrack unit with intelligent digital faders, a Compumix IV automation system, and electronic crosspoint switching system on the outputs.

The Westar audio console for video post-production and sound sweetening is a 36-input, 24-track unit available with or without automation. Westrex also introduced its Digital Master Motion Control for film and video.

Console giant Rupert Neve, recently acquired by Siemens, featured its 51 Series console. Features include dual multitrack, the ability to assign dynamics to other channels by linking, four-track as well as stereo configurations, and new monitoring.

Sony Pro Audio waded into uncharted waters with the intro-

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duction of its very first broadcast console, the MXP-2000, first seen at AES. Slated for February delivery, the board features up to 16 inputs and accepts 20 control modules. It's now in mono, but a stereo module will be available in the future. Sony also had a new recording/remix console, the MXP-3000, available with optional automation.

The latest item from Harrison Systems was the 10 Series automated console, with assignable functions. It can be preset for music, scoring, post-production, and film sound.

Solid State Logic showed its 5000 M Series audio production system, introduced at the NAB.

Introduced in prototype at NAB, Studer Revox's 961 and 962 compact mixing consoles for video editing and post-production appeared as production models for the first time.

Panasonic featured its Ramsa WR-8616 post-production recording console with 16 balanced stereo or mono inputs and 16-channel monitoring.

Graham-Patten Systems, known for its video switchers, showed the 612 and 616 ESAM Edit Suite Audio Mixers, designed for direct control by a video editor.

In small mixers, Sennheiser introduced the M8, a new portable with eight inputs, dc or A-B phantom power, and prefade listen on each channel.

Shure Brothers had a new stereo ENG mixer, the FP32, a three-input, two-output, transformer-balanced unit. Shure also featured the FP42, a version of the M267 stereo production mixer with four inputs and two outputs.

Mics, intercoms

An unusually sophisticated intercom system, the Audix digitally controlled intercom, was featured at the A.F. Associates booth. This is not a traditional matrix system but rather works on a single coaxial loop that allows 60 simultaneous conversations. The system is fully software based and has machine control capa-

"With the 6120 I have control over my quality"

Dameon Higgins founded Delta Sounds and Video in 1976 after 10 years in broadcasting. This radio experience and his uncompromising audio standards quickly established Delta as a very successful recording studio and entertainment sound service in the Orange County/LA area. Although the company specialized in supplying complete custom sound programs and systems for school dance DJs and Discos, it wasn't long before Dameon found himself turning down a lot of *tape duplicating* requests. The high quantities were not practical for "real time" duplicating, and the jobs that he "farmed out" to high speed duplicating companies often came back to hurt his image.

Eventually, because of missed profit opportunities and a frustrating lack of control over quality, Dameon decided to install his own high speed duplicating equipment. He looked carefully at every product on the market and finally selected the Telex 6120, seven slave, 1/2 track cassette-to-cassette model. He knows that he can add on to his system as his business grows, but for now his 6120 can copy up to 280 C-30s in one hour, and is easily operated by one *non-technical* employee because of its compact size, single button operation, jammed or short tape warning lights and automatic master rewind. Dameon hasn't regretted his decision for one moment because he now has a thriving additional business of duplicating voice and DJ audition tapes, seminars and syndicated radio programs. Now he reports a zero reject rate and his quality image is under *his* control where it belongs.

For over twenty years now, Telex has been the choice of those who, like Dameon Higgins, are fussy about the quality of their duplicate tapes. To learn more about what the 6120 can do for you, write to Telex Communications, Inc., 9600 Aldrich Avenue South, Minneapolis, MN 55420. We'll send you complete specifications and production capabilities.

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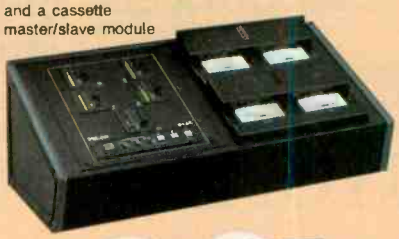
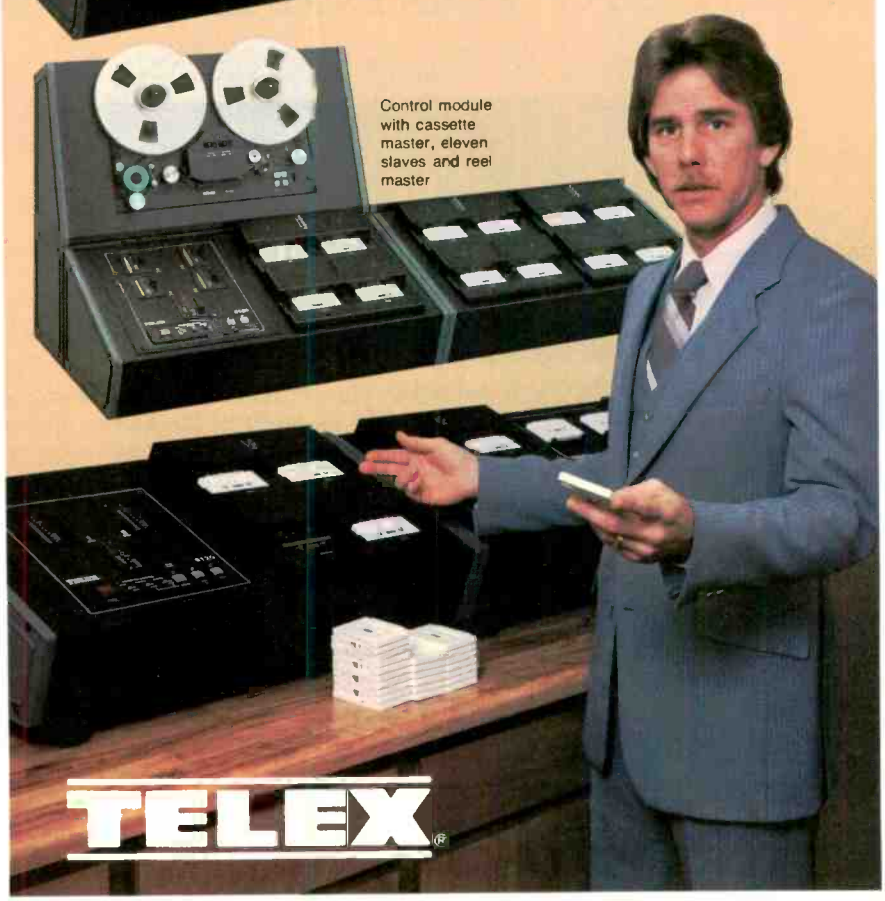
Control module and a cassette master/slave module



Control module with cassette master, eleven slaves and reel master



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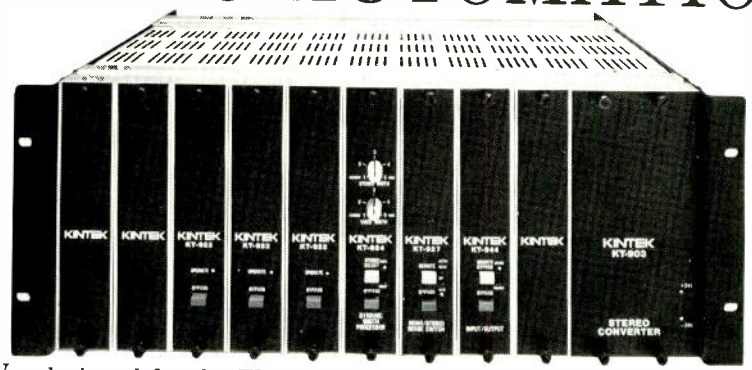
STEREO AUTOMATION



Was designed for the TV broadcaster who demands the ultimate stereophonic converter. With many years of audio research in the motion picture industry, Kintek has developed the KT-903, which automatically provides continuous dynamic conversion of mono to stereo and yet bypasses stereo originated programs. Its cognitive speech circuitry centrally focuses the dialogue, making it sound credible. Some additional features are:

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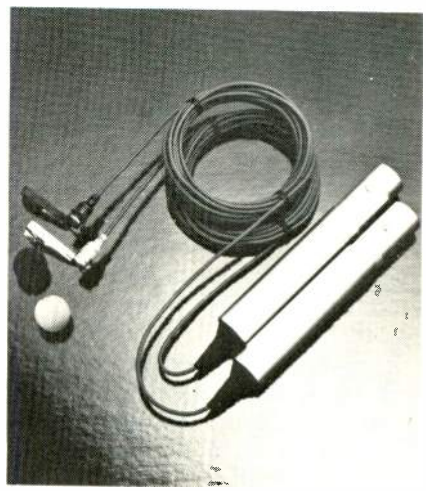
bility and very sophisticated diagnostics.

H.M. Electronics introduced a lightweight (11 ounces) cabled intercom belt pack in a more compact, contoured-to-the-body design. Also new was the System 87 wireless hand-held transmitter and receiver.

Micron Audio's CNS 500 Series, featuring complementary noise suppression, is now in full production.

Swintek introduced the Q2R dual frequency wireless receiver, switchable to F1 or F2.

Sony featured a new wireless mic, the WRT-67, along with an economical new lavalier mic, the



Sony's ECM-44 lavalier mic.

ECM-44. The company also introduced its first professional power amplifier, the dual-channel, 45 W per channel TA-N7050.

Audio T&M

Television engineers worried about their stereo signals with the advent of MTS found relief at the Tektronix booth. Tek's new 760 stereo audio monitor includes not only a graphic CRT display of the stereo audio signal but also a bargraph display that can be used for setups (accurate phase and amplitude measurements) and operations monitoring (accurate peaks). The CRT and bargraph displays both incorporate information about amplitude, stereo separation, and phase correlation.

Competing with the Tek 760 were two other systems first shown at NAB: the TFT 850 BTSC TV stereo aural modulation monitor and B&B System's Imagescope products. The TFT 850 reads almost everything but the displays are the usual meters. B&B showed its Stereoscopes for X/Y display of stereo audio phase and the interesting Imagescope, which show s the dispersion of energy on a CRT. The CRT is divided into left and right quadrants, with the mono signal represented in the center of the CRT.

In its SMPTE debut, Audio Precision showed its IBM PC-based System One audio test system, introduced at the NAB. New for SMPTE was optional intermodulation distortion stimulus and response measurement capability.

New from Otari was the EC 201 portable, battery-powered time code reader, featuring −4 balanced input and −4 balanced reshaped output.

Kintek featured its reverse polarity correlation detection monitor, which compares vector sum signals to a scale. If a reversal is detected, a relay flips to correct it. There's a longer constant on music than on speech for music, with deliberate phase effects.

Real World Technologies showed a stereo coherency monitor, another entry in the new but growing field of detecting stereo phase reversal, especially necessary for MTS.

A new player in the MTS game, Elecon (Universal), introduced Eiden MTS stereo equipment. The Eiden stereo generator, which includes the SAP and pro channels, sells for $11,000. Its MTS demodulator features no processing, and sells for $13,000.

One-Inch, Beta Lead Tape Introductions

All the interest in half-inch recording and playback systems is keeping tape manufacturers busy responding with new tapes, especially for the Beta format. Mean-

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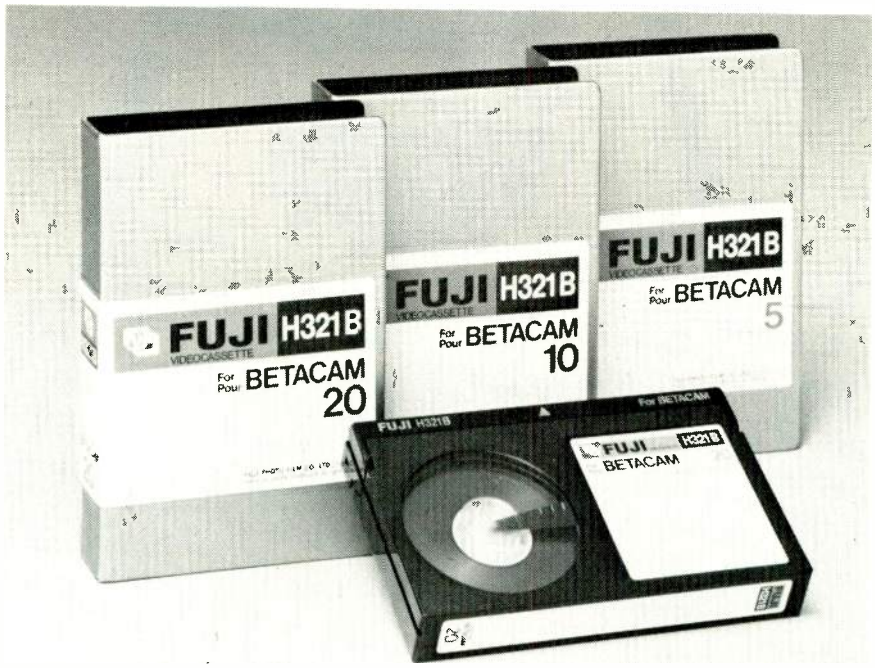

New Betacam tapes from Fuji.

while, more manufacturers are vying for shares of the one-inch tape market.

Agfa-Gevaert says its new PEV 2625 Broadcast Plus Type C tape, announced at NAB, will be available early this year. Also new from Agfa is an improved formulation for its half-inch VHF tape.

Fuji introduced a trio of new tapes at the SMPTE show, and also announced a reorganization of the Industrial Products Group of its Magnetic Products Div., now known as the Professional Products Group. The new tapes include the H621E one-inch tape with improved performance characteristics, plus two new half-inch tapes, H421M for M-format and H321B for Betacam.

3M's primary focus at SMPTE was its antistatic technology, introduced initially for the half-inch

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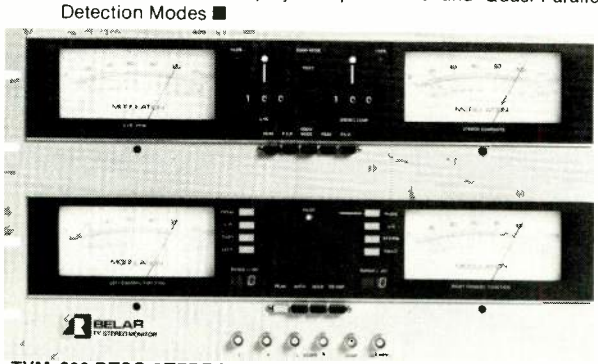

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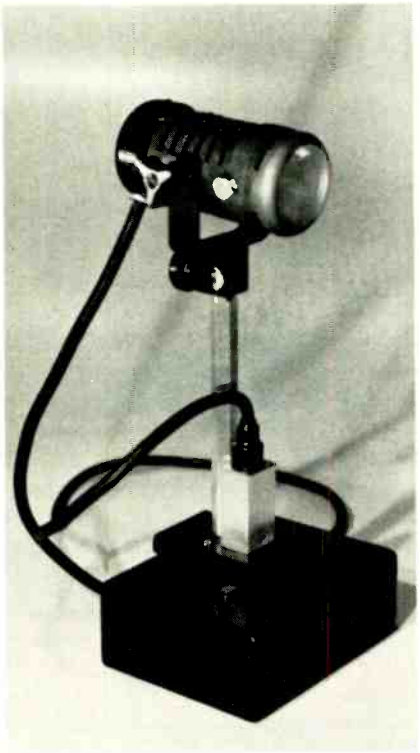
format and now available in a new MBR U-Matic product scheduled for sale by this month.

No one, of course, is more committed to Betacart than Sony, which introduced its BCT Series Betacart cassette at SMPTE. The new tapes, available in five-, 10-, and 20-minute lengths, are designed for durability and reliability.

Yet another new half-inch tape made its debut at the Eastman Kodak booth. The new Eastman professional videocassettes were to be available by late 1985 in five-, 10-, and 20-minute Beta cassettes and 20-minute M-format cassettes.

Maxell's new Master Broadcast one-inch tape, introduced at NAB, made its first SMPTE appearance.

Emphasizing the consistency and durability of its tape products, Ampex repeated its NAB tape torture tests, subjecting both one-inch and ¾-inch tapes to "cruel and unusual punishment."



Frezzi Mini-Fill with battery/stand.

Production Essentials Light Up the Show

They may not be the sexiest items on the floor, but batteries and lighting equipment are something no television operation can do without. A number of new announcements in the lighting and power field sparked interest at SMPTE.

Comprehensive Video unveiled a new lighting design system called APAS that consists of seven compact and versatile fresnel, soft, and flood lights, plus clamps, scrims and gel frames. Comprehensive also introduced its new Log-It computer software, which generates a computerized shooting log.

Frezzolini showed an adapter that attaches its Mini-Fill light to a regular camera battery so that the battery becomes a "stand" for the light. Also new was the Multiple Mini-Fill kit, which comes with three light heads, three stands, three dichroic filters, and an ac inverter with four channels.

In power, Elecon introduced the Elepack 90 camera battery.

Christie featured its programmable CASP universal battery charger and analyzer.

PAG America showed its line of microprocessor-controlled chargers and nicad batteries, including the Speedcharge 6000, the Mastercharger, and the 10/90. The newest item was a 4 Ah Betacam battery, the PP3B.

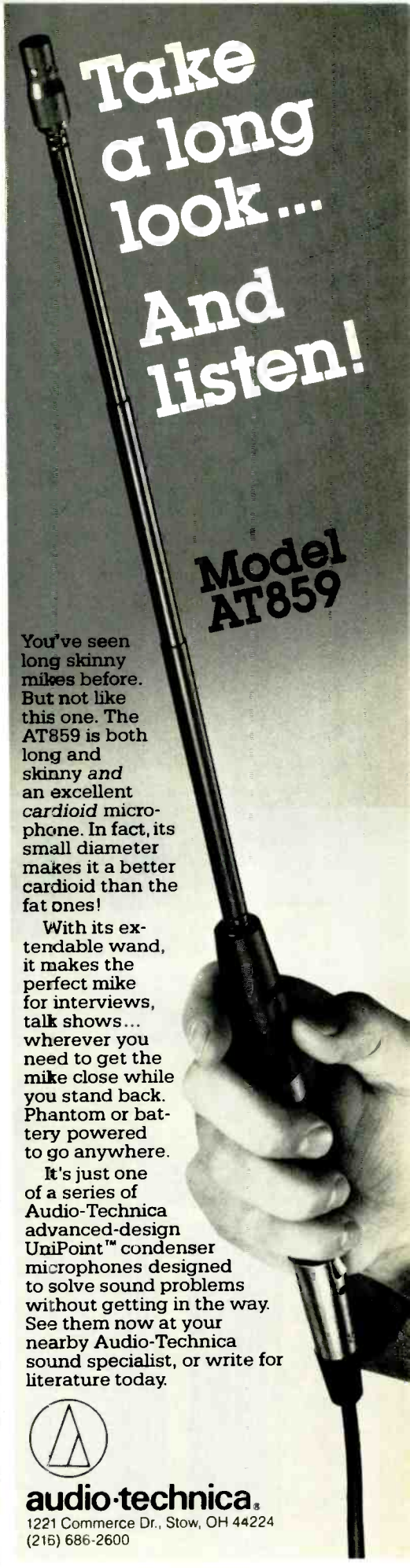
Anton/Bauer introduced the Powerstrap battery shoulder strap, a 12 V, 4 Ah unit for portable video recorders and low-voltage lights.

G&M Power Products featured a camera battery with built-in charger and all-metal case that puts out 4.5 Ah and lists for $495.

Alexander promises new battery belts and a new mini snap-on battery by NAB.

Cine 60, bullish on belts, featured its 8 A switchable belt, which can run a camera, recorder/camera, and/or a light

Perrott Engineering showed its line of nicad and silver batteries and belts and its minichargers.



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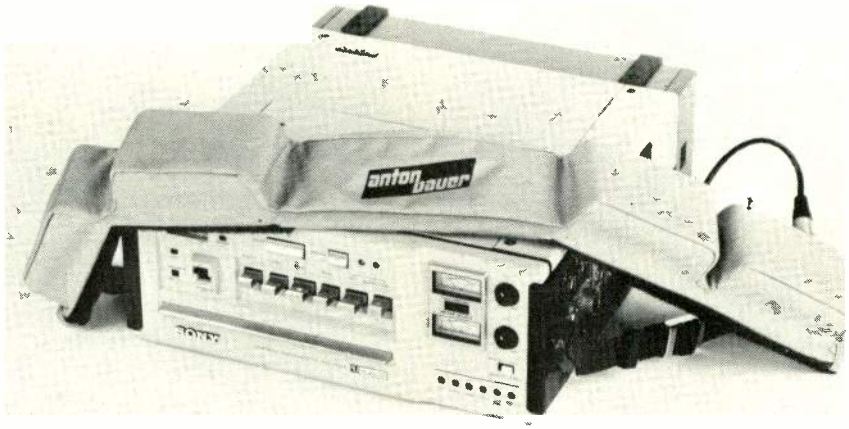

Anton/Bauer's Powerstrap.

Support, teleprompters

Compu = Prompt introduced a new computer, the CP1130XM, with 5500-line storage (80 minutes continuous scrolling). Also new was the Micro, an ENG-style teleprompter that can work on a handheld camera.

Listec showed its teleprompters in nine-inch, 15-inch, and high-visibility 19-inch versions.

Canon introduced the production model of its new counterbalanced camera pedestal, seen in prototype at NAB.

Karl Heitz featured the new Gitzo 564LM microphone fishpole, with four black anodized extensions and two soft grips. It extends to seven feet and folds to fit into a briefcase.

Other camera support manufacturers, including Sachtler, ITE, and O'Connor, showed established lines. **BM/E**

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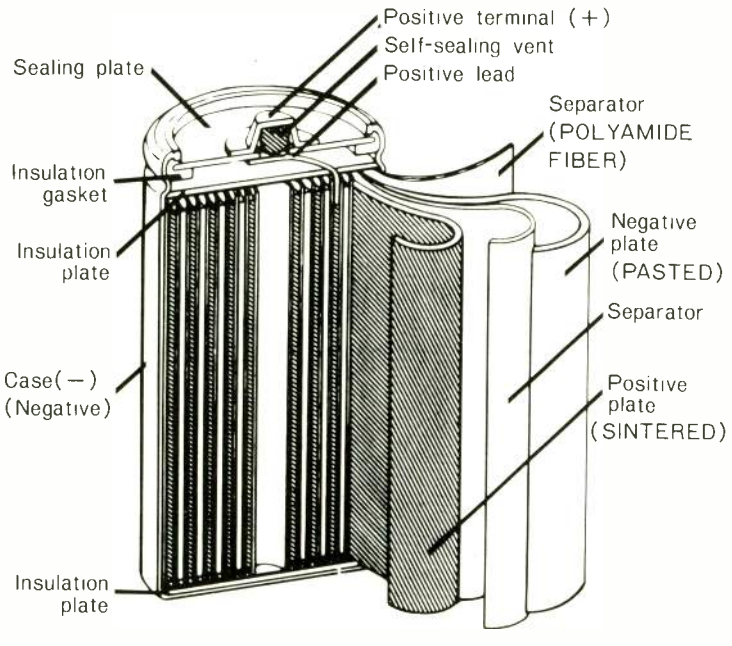

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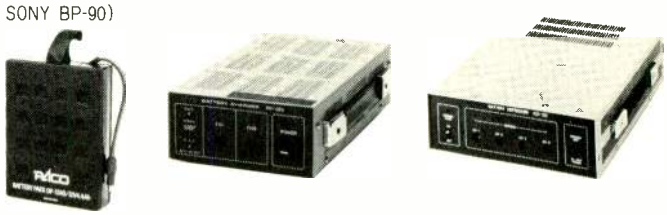

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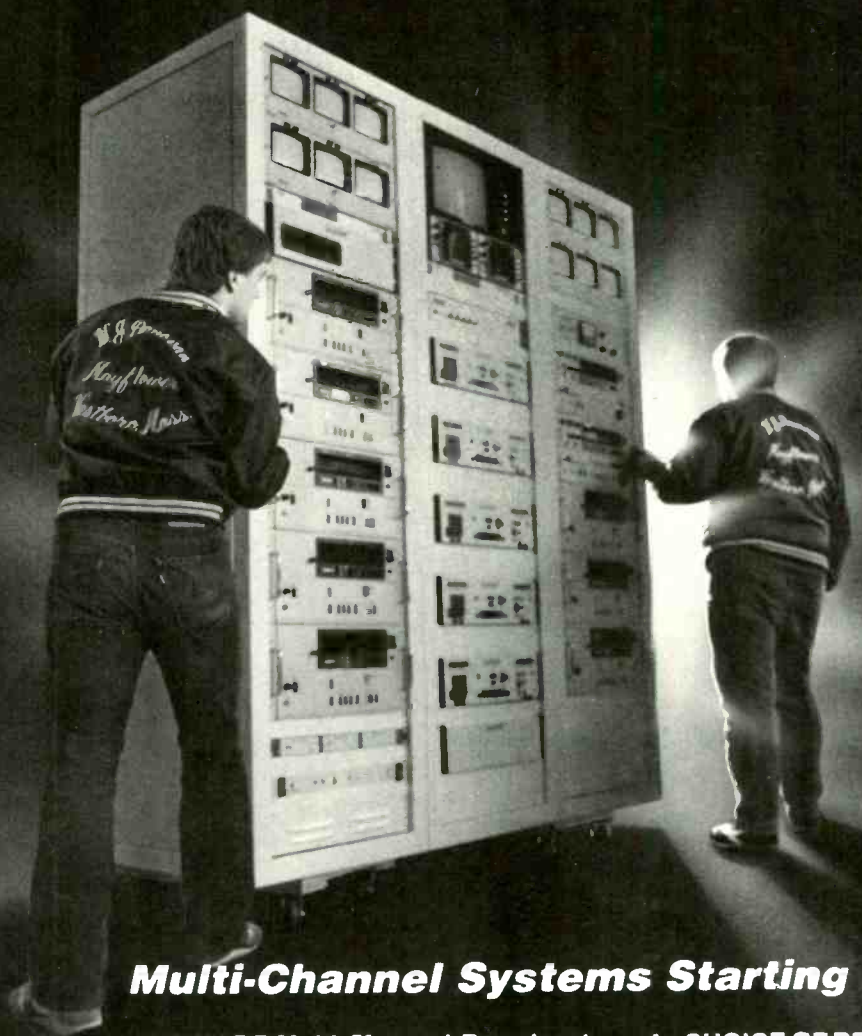

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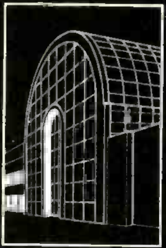

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Group Conscious Engineering In The Post 12-12-12 Era

Engineers and engineering find new pressures and demands come with the increased power of the broadcast group.

By David Hawthorne

Since the number of licenses a single owner may hold in the three broadcast services (AM, FM, and TV) has been increased to 12, 12, and 12, group broadcasters have been the darlings of Wall Street.

The big questions for engineers and engineering, however, is how will the newly cherished and highly visible broadcast groups deal with their acquired power? There will be not so much a dramatic addition of new trends to which engineering will need to respond as an intensification of emphasis on aspects of the engineering function that have been evolving continuously over the past few years.

John Swanson, vice president of engineering for broadcast of Cox Communications, Inc., says of engineers, "...from the corporate point of view, the absolute guideline is to become much more bottomline oriented." This means that a premium is to be placed not only on the engineering skills but also on management skills. Broadcast groups are still concerned primarily with how each station performs in its own market but there is some evidence that each station needs to improve its consciousness of overall corporate goals and objectives and to improve its ability to take advantage of the economies of scale that devolve to the group owned station.

Managing stations within the group

By and large individual stations remain focused on performance in their individual markets. "The goals of the corporation," says Tom Bracanovich, vice president of engineering for Malrite, "are the same as goals of the individual stations—to be successful." That is not to say that there is complete autonomy but rather degrees of autonomy.

Broadcast Station Assignments and Transfers Granted by the FCC

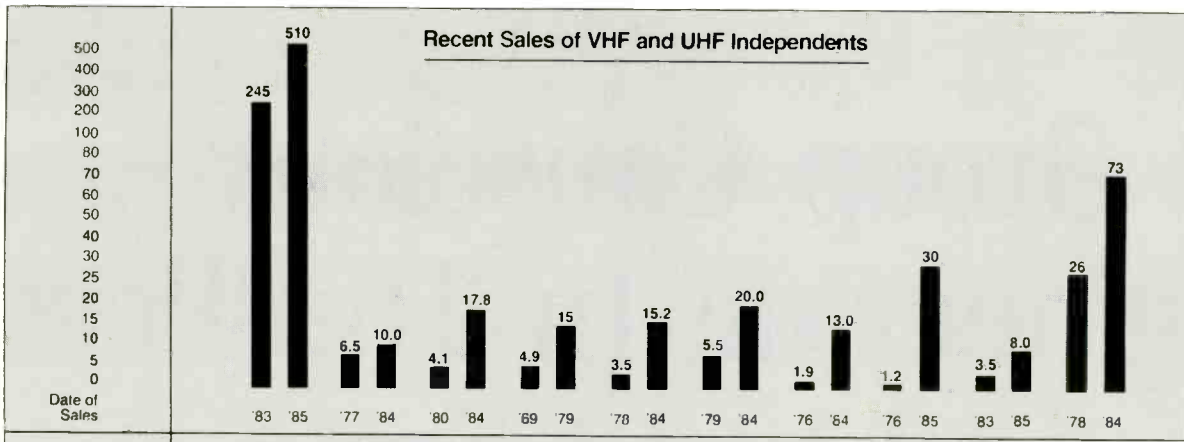
	FY 1985 (Oct. 1-Sept. 30)	FY 1984
AM	1117	1000
FM	986	814
TV	561*	381

*Estimated. Full annual report has not yet been released.

The area where most station operations feel the impact of the group is in the purchase of major equipment where groups regularly review the individual stations' annual demand and see if group resources can be pooled to produce significant savings. Says Swanson, "About five of our stations last year, for instance, ordered three or four studio cameras apiece. We review those submissions, and if we can get a consensus on type and manufacturer we try for a group discount." However, notes Swanson, "We haven't taken it much beyond the major equipment level at this point..." since there is a need to leave many purchasing decisions with the individual station chiefs. In this respect the purpose of leaving many of the purchasing decisions with the station chief is twofold: to preserve each chief's influence with vendors and to permit each chief to respond to local conditions as appropriate.

Says Joel Chaseman, president of Post-Newsweek Stations, "The group can be an advantage to the individual station." He notes, for instance, that commercial production is a "big deal" for Post-News-

12-12-12 Era



Figures from Frazier, Gross & Kadlec, of Washington, D.C.

week's Hartford and Jacksonville stations but not such a major part of the Miami station operation. The Detroit Post-Newsweek station carries the Detroit Tigers baseball games and, as a result, "has two big, well-equipped trucks." From time to time, notes Chaseman, the other stations may have a short-term need for a specialized commercial production function or a need for a large rig, and can get access to the resources of the other station. The point is, according to Chaseman, that different stations in

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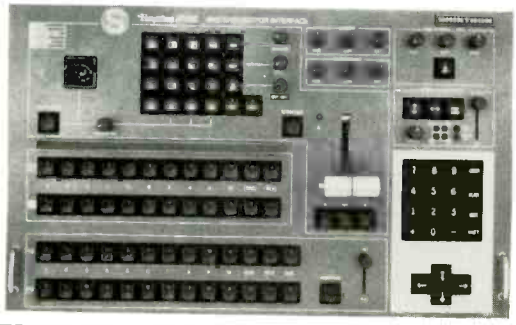

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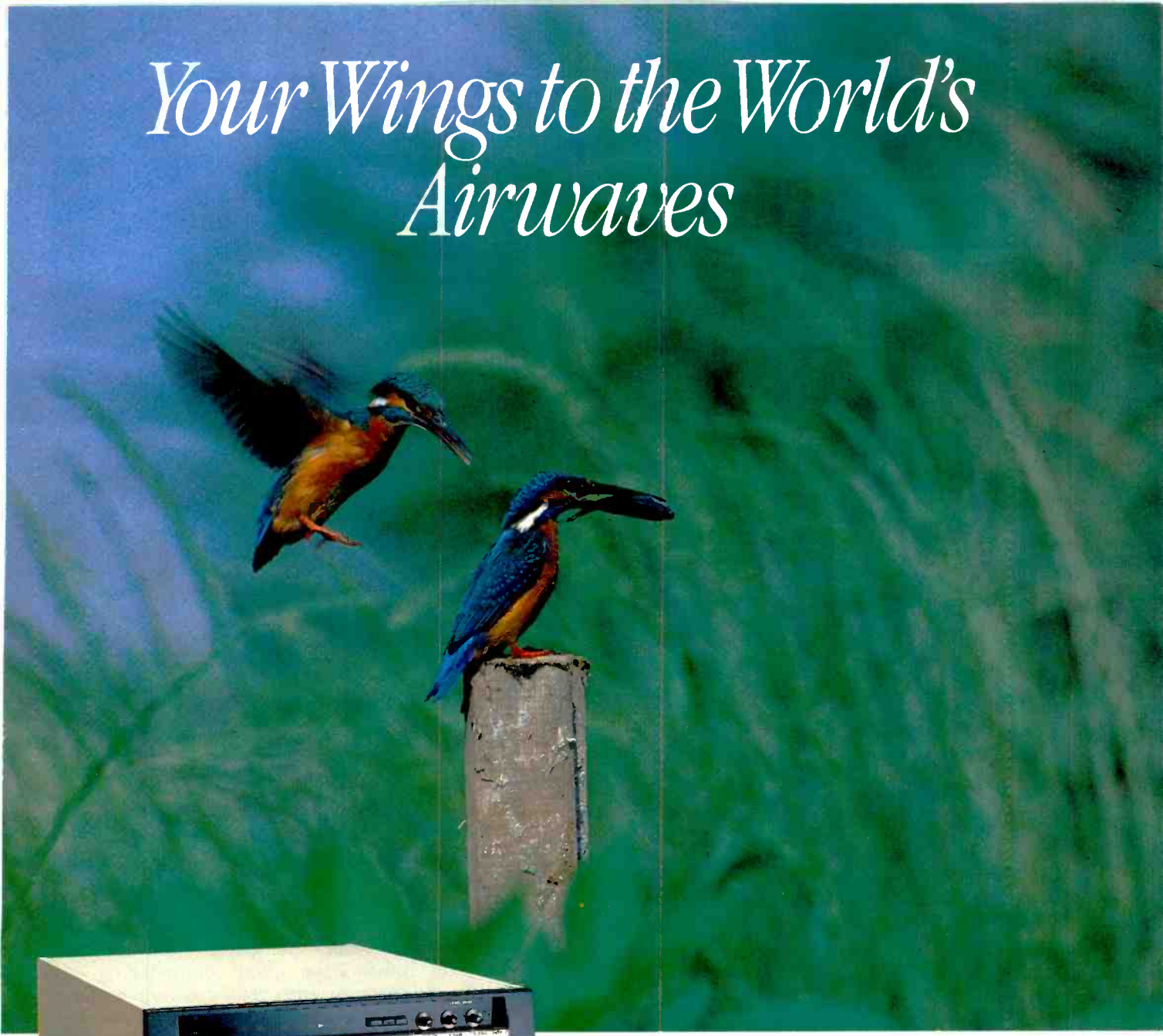

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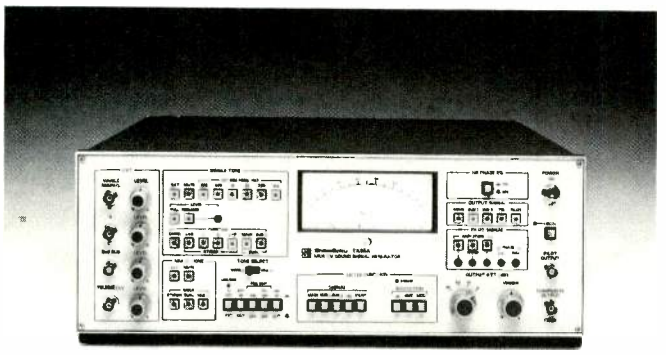

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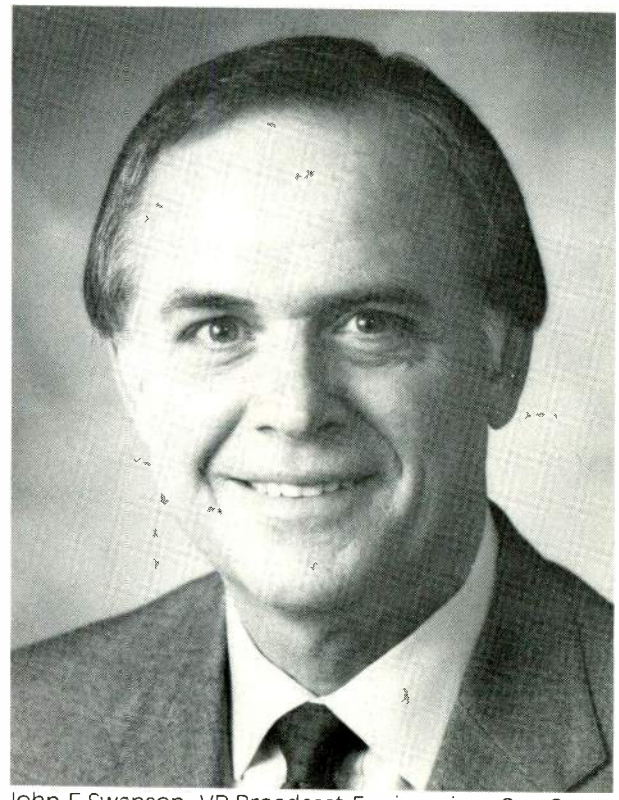

John F.Swanson, VP Broadcast Engineering, Cox Communications, Inc.

different markets develop at different rates, responding to different needs. As members of a group they can draw on both the resources in equipment and know-how from sister stations.

All of the groups interviewed for this story had some form of "friendly user group" approach to exchanging information about engineering. At Malrite, for instance, each chief engineer writes a weekly report which not only deals with developments at each station but may also raise engineering questions and solicit help from other stations to find solutions to problems.

Qualities in the 'group conscious engineer'

For some time now, greater emphasis has been placed on managerial skills for engineers than in the past. Largely, this reflects a number of powerful forces beyond the simple expansion of the number of stations a single group may operate. Primarily, the advance in technology to general use of solid-state systems and the adoption of many types of computerized systems has placed a premium on engineering knowledge and skills related to these technologies. Observes Otis Freeman, director of engineering, Tribune Broadcasting Co., "We always need stronger, better educated engineers especially in the digital field." Of the relative value of engineering skills versus management skills, "They both have to be present" in today's engineer, says Herb Shubarth, vice president of engineering, Gannett Broadcast Group.

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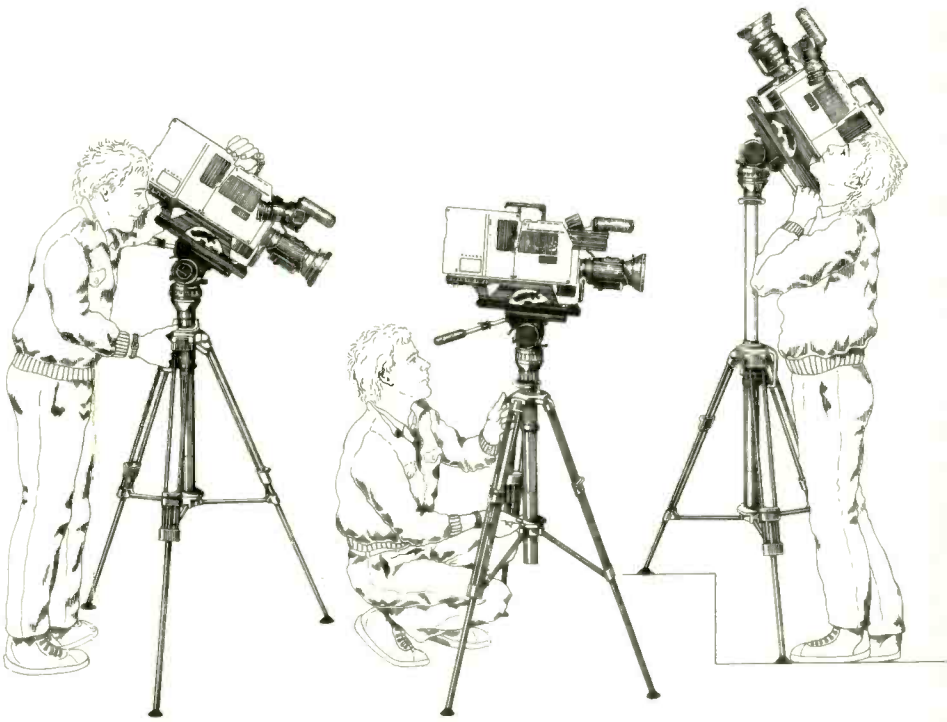

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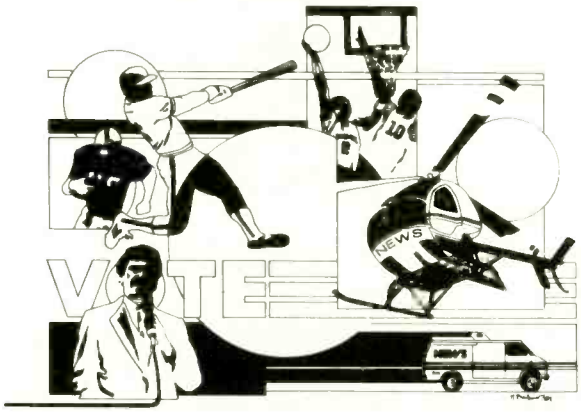

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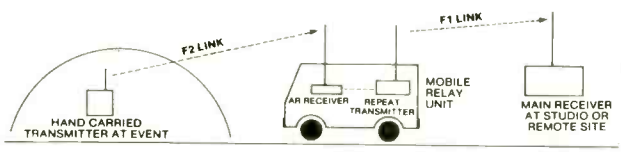

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Joel Chaseman, President, Post-Newsweek Stations, Inc.

Though Shubarth was probably the most forceful of the interviewees on the subject of the need for "solid engineering skills," he too put great stock in other "people/management skills." Engineers, Shubarth stresses, "...have got to have an open mind. Their ability to explain [is critical] and is probably related to their ability to teach," a major requirement in today's engineering environment.

'Group conscious engineering'

While most groups clearly indicate that market-by-market performance is still their main concern, it is clear that group broadcasters have concerns that go beyond simply the health of one individual station under their management. Groups, themselves, do vary depending on just what kind of group they are. The Tribune Broadcasting group of stations, for instance, are large-market independents. As such, different stations within the group have different assets and consequently, different missions. WPIX-TV, in New York, handles the INN news operation in a facility superbly equipped for that mission, which currently feeds about 150 independent stations across the country with a nightly "network grade" newscast. WGN, Tribune's Chicago operation, has three large studios and consequently handles some significant program production tasks important to both other stations in the group and to the Tribune group's syndication efforts—most notably the Siskell and Ebert *At The Movies* film criticism and review program. Though Freeman was not discussing plans for Tribune's recent acquisition of

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KTLA, the huge Los Angeles independent, he does say, "If we had a station located and equipped for major productions we would use it." In Atlanta, the Tribune Co. maintains a special graphics organization that works with an outside graphics production facility to produce promo campaigns for many of the film packages and syndicated program packages carried on Tribune stations.

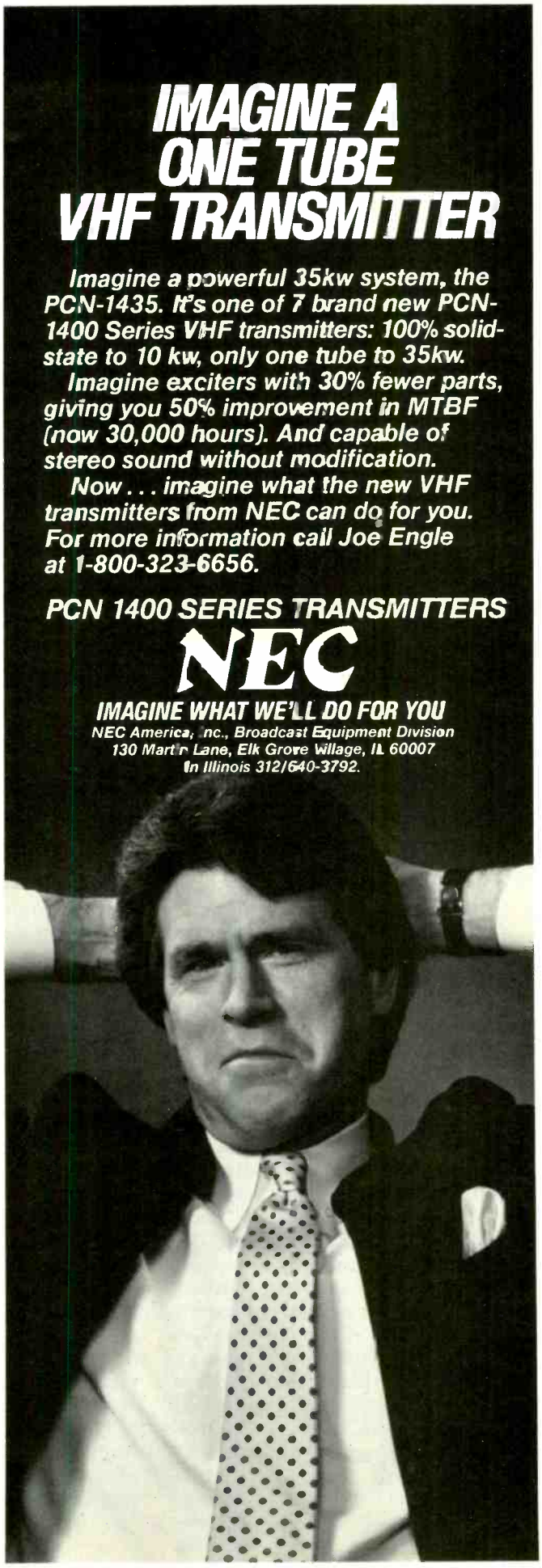
It is important, adds Freeman, for "management engineers at the stations to interpret what management wants and then have motivated people to get it done. Many ideas percolate up from the bottom from people in studios and control rooms. We encourage this. We like to think of our engineers as a team."

Areas for concern

A number of areas for future engineering were aired by those interviewed. Generally there is some concern about a decline in engineering knowledge and experience with RF. This is largely due to the increased reliability of modern transmitters and the use of remote control. No one is out babysitting the transmitter anymore, gaining intimate knowledge of the system. Moreover, the dropping of the requirement for the first-class phone license and the subsequent use of contract engineers have adversely affected the use of smaller market stations as a training ground for engineers. "The contract guys," says one engineering manager, "are excellent fixer uppers, but because they don't get involved in the day-to-day operations of the stations, they fail to pick up the management skills that are so vital in today's engineering."

Adds Post-Newsweek's Chaseman, "We've now grown a generation of engineers and technical supervisors who are comfortable with the new requirements of group broadcasting. They are sophisticated on two levels: They are sophisticated about technology, and they are sophisticated about the use of other people."

This, then, seems to be the most important aspect of engineering in an age of increasing prominence and power for group broadcasters: Engineers need to concentrate on developing people skills, management skills, and the ability to understand corporate goals and objectives, which, though still focused on each market, also include an element of overall corporate strategy. Engineers must become full members of the management team, able to deduce the engineering implications of corporate and operations policies and able to explain engineering concerns and criteria in an understandable and detechnicalized language. It is not so much that engineering has decreased in its importance as it is that it has become integrated with other management concerns, and so, it must be aggressively supportive of a greater variety of missions. **BM/E**



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Business Briefs

Chyron Corp. **has approved a proposal by CMX Corp.** to sell Chyron 700,000 shares of CMX common stock. In addition, Chyron has agreed to purchase an additional 1.3 million shares of CMX stock pending the approval of shareholders. In a related item, Chyron shares have now begun to be traded on the New York Stock Exchange.

NJ-based **Artronics** has acquired its largest systems dealer, Studio Tech.... In the telecommunications field, **Spectrum Planning** of Dallas recently acquired Compucon from the A.C. Nielsen Company. Compucon will continue its operations as a subsidiary of Spectrum Planning.... In other acquisitions, **Discovery Systems** of Dublin, OH, purchased Morningstar Video Productions.

Prime Ticket Network, a new national cable sports network, has selected Hollywood's **The Post Group** to handle all of its post-production work....**EECO's** EMME Computerized Editing System was recently installed in Maritz Communications Company, Gardena, CA; Producers Communications, St. Louis, MO; and Videogenic, Toronto, Canada.... **Film/Video Equipment Service** of Denver provided Betacam camera/recorder packages and related accessories for the annual Professional Golfers Association Championship shoot, as well as its new Schwem Gyrozoom for use in NBC's *Sportsworld's* 16-day coverage of the Coors Bicycle Classic.

Utah-based film and video services company **Polymedia** has added the Montage Picture Processor to its list of equipment, making it the only facility between the west coast and Dallas to have such a system....Forecast Installations has provided **custom cabinetry** for edit rooms in the newly refurbished New York City studios of HBO.... **Southland Video Productions,** a post-production facility offering both audio and video services, has opened in Charlotte, NC.

New York City's St. John's University recently launched its **state of the art, $3 million Television Center.** The facility boasts computerized studio and field cameras manufactured by Ikegami, including three microprocessor-controlled Ikegami HK-357As. The center will be made available to assist nonprofit and charitable organizations with teleproduction needs....**Comsat International** is providing satellite transmission from the United States to France, 24 hours-a-day to NETCOM. This is a full-period, nonpreemptible service transmitted from Andover, ME to France's Pleumeur-Bodou earth station.

The post-production room at Video Production Services, Inc. (VPSI), the first video production company in Indiana, features a Sony Betacam videotape system, BVW-10 player, BVW-15 Dynamic Tracking player, and a BVW-40 recorder.

Accu-Weather is now providing **complete one-minute weather segments** for use on-air to WSJT-TV, Vineland, NJ....**WCPX-TV,** Orlando, FL, recently produced a set of five-second promotional tags highlighting the demographic growth of its audience with animated graphics designed on the Editel/NY Paint Box with Mirage. Effects include an animated chart highlighted by incandescent red arrows to indicate viewer growth.

Sony Professional Audio Division has expanded its U.S. dealer network with the appointment of New York City-based Westec Audio Video Ltd. to handle systems designed for the teleproduction and entertainment industries including consoles and mixers....Effective on the first of this month, BASF has restructured its operations in North America, combining all activities into a new company, **BASF Corporation**....3M will move its **¾-inch U-Matic videocassette and professional reel-to-reel audio product manufacturing lines** from Freehold, NJ to facilities at Hutchinson, MN and Wahpeton, ND. The move will be completed by June.

Satellite TV equipment supplier **R.L. Drake Company** has opened its first Canadian office at 655 The Queensway, Unit 20, Peterborough, Ontario K9J 7M1 (705) 742-3122....**Trident USA** has moved its corporate U.S. office to 308 North Stanley Ave., Los Angeles, CA 90036....**WLM Consultants** is a new full-service broadcast sales and operations consulting firm founded by William Lee Mockbee, former VP of research and development for WCVB-TV, Boston.

Among the personnel changes this month, Scott Ross has been appointed president of **One Pass**....At **Biamp Systems,** Susan Stamm is the new eastern regional sales manager....Robert McNabb is the new regional sales manager for the Pacific region at **Agfa-Gevaert.**

Image Resources has named Joe Kelman CE/producer.

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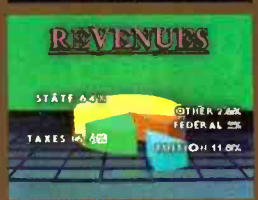

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